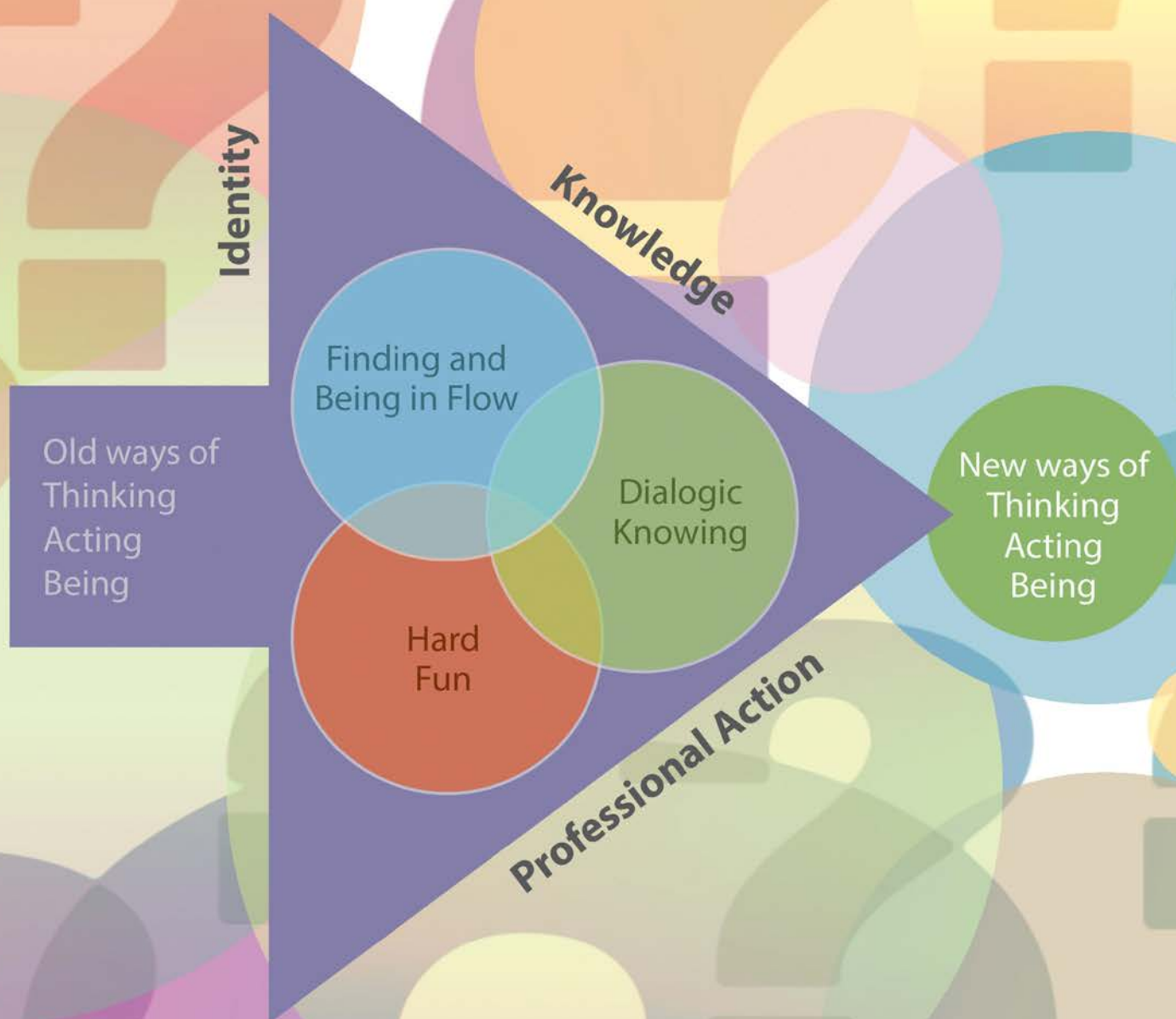


A NEW MODEL OF PROBLEM-BASED LEARNING

Inspiring Concepts, Practice Strategies
and Case Studies from Higher Education

Terry Barrett



AISHE

The All Ireland Society for Higher Education

Author: Terry Barrett

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The PBL students I have facilitated have inspired me as to the potential of PBL for dialogic knowing, creativity and hard fun and I am grateful for that.

Dedication

May this book contribute to providing challenging, collaborative and creative learning environments for students across the globe and across a range of disciplines.

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Chapter Two

Suggestions for designing problems to expand students' knowledge, professional action and identity development

Introduction

A PBL Practitioner's Vignette



"Terry, will you come to us in Finland and facilitate some problem design workshops. Our PBL programmes in different disciplines have been running for a number of years and we now want to write some more new problems".

*Marja-Leena Lahteenmaki Principal Lecturer TAMK
University of Applied Science, Tampere, Finland*

I replied that I would be happy to do this as I was writing a book chapter on problem design and could send her a draft version and base the workshop on this. Some of the problems that different Finnish teams designed now appear as sample problems in this chapter. Marja-Leena has written a PBL practitioner's response at the end of the chapter.

For me, facilitating problem design workshops is a very creative and energetic experience. Designing high-quality problems is a key success factor for PBL initiatives and I thought it was good that they were investing time and resources into doing this well. I hope that you as PBL practitioners will find this chapter helpful in doing the vital work of designing problems.

Chapter Overview

This chapter will help you to:

- Think in fresh ways about problem design
- Use a new inspiring concept to shape some of your approaches to problem design
- Choose from and apply some of the practical suggestions for designing problems
- Learn from sample problems in various formats designed in different disciplines and countries
- Use questions, triggers and further resources to develop new strategies for problem design in your PBL initiatives

You bring what you already know about using problems in education, both as a student and as a teacher to the reading of this chapter. So begin by tapping into your experience and understandings from having worked with problems as a student.

Stop and Reflect



Think of a specific problem that you learnt much from as a student

- How was the problem presented to you?
- Why was the problem effective and memorable?
- What new knowledge, skills or attitudes did you develop?
- What are your current issues about designing problems for your own students?

Problem and Trigger Design

A “problem” is a trigger that acts as the starting point for learning in the problem-based learning process. In problem-based learning initiatives some people choose to use the word “problem” (for students to work through).

Others prefer to use the words “trigger” (to prompt learning) or “scenario” (to understand and respond to) or a “starting point” to begin a journey of learning. I will use “problem” in the generic sense to cover all these problem formats.

Philosophical perspectives on the importance of problems in problem-based learning

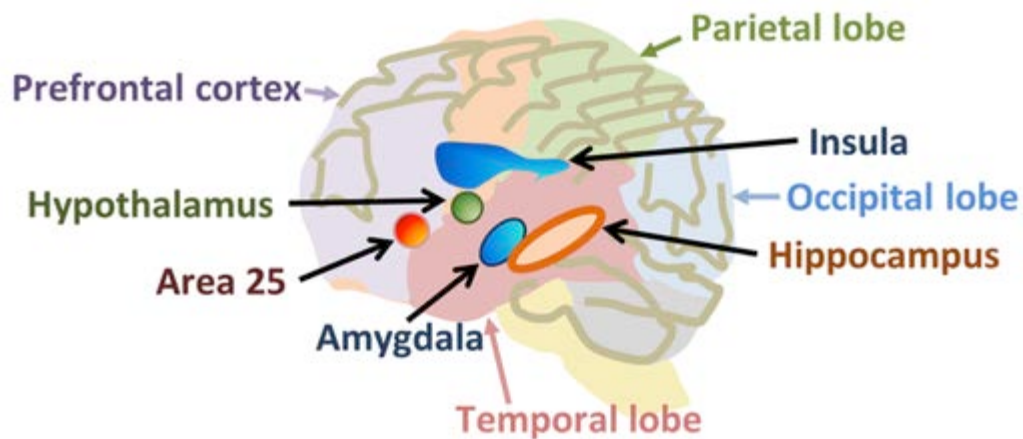
Paulo Freire provides us with a philosophical understanding as to why education should start with problems. Freire asserts that we can only know something if we problematise it and that knowledge acquisition must begin with problems, puzzles and tasks (Freire 1972). And so we give PBL students a problem. We deliberately catapult them into a situation where the only way that they will solve the problem is to develop new knowledge of different kinds. Freire states that: “in problem posing education people develop their power to perceive critically the way they exist in the world with which they find themselves” (Freire 1972: 117). Thus, in problem-posing education we invite students to think critically and to journey to deeper levels of consciousness: Thinking and acting critically is key to developing as a person, as a professional and as a citizen.

Neuroscience perspectives on the importance of problems in problem-based learning

Sadlo (2011) and O'Connor (2010, 2012) provide us with inspiring neuroscience perspectives on the importance of problems in PBL. Our brains are hotwired to solve problems so problem-based learning is compatible with our brains' natural highly evolved ability to respond to problems, challenges and threats in our environment:

There is evolutionary evidence that problem solving is the hallmark of our species (Nataraja 2008). The human brain grew in size as our predecessors had to learn new information to solve problems of living in new territories (Wilcock 2006). Our huge prefrontal lobe is ‘designed’ to analyse new complex situations (cognitive processing) (Sadlo 2011: 434).

Figure 2.1 The Human Brain (O'Hare 2012)



O'Connor (2012) highlights the importance of the problem in PBL from a neuroscience perspective as a device for harnessing the problem-solving capacity of the brain by providing a focus for students' attention and a target for student learning.

Learning is a matter of attention - of choice, and most important to the dynamic of learning is the *what* - the target; rather than the *how* - the path. The frontal lobes of the brain focus attention on what is to be learned while the subconscious mind in part located in a deeper brain structure called the midbrain delivers the drive to achieve it. ... PBL is a good example of a social learning environment that capitalizes on using the drive to solve a problem to create a learning target in our brains. This is the golden key to accelerated learning for without a target the brain is not involved in deep learning (O'Connor 2012: 38-39).

We need to design problems that are so intriguing they mobilise the brain to make many connections. Well-designed problems provide engaging and stimulating starting points for learning and O'Connor stresses that the

initial moment of learning is important as the more brain structures recruited and therefore the more connections created the easier it will be to recall that information (O'Connor 2012: 38).

Context in learning is key as it is easier for students to recall learning in a specific context if they have initially acquired this learning in a similar context. Thus problems that mirror real-life professional practice can help students to see the relevance of what they are learning in the first instance, and later to recall this learning in professional contexts, as “the learning environment and the recalling environment should be equivalent since the chances of recall are improved” (O’Connor 2012:38).

Designing high-quality problems

A key characteristic of problem-based learning is that students are presented with the problem at the *start of the learning process* before other curriculum inputs (Hung 2016). Other teaching strategies use problems but this is often after students have experienced lectures and other curriculum inputs. Some teaching strategies leave working with problems till the end of the module or unit or for more senior years of the curriculum.

Why use problems in education? The five arguments that Jonassen (2011) proposes is that working with problems is:

- 1) Authentic learning
- 2) Transferable learning
- 3) Meaningful, intentional and mindful learning
- 4) Time effective learning and
- 5) A set of opportunities for students to practice the key skill of problem solving.

Why does PBL start the learning process with a problem? Problem-based learning starts the learning process with a problem in order to:

- Engage students actively in their learning
- Motivate them to learn more
- Encourage them to see the relevance of the knowledge they will learn to their future career
- Activate the prior learning of all the students
- Develop their critical and creative thinking and

- Give them opportunities to construct knowledge together from elaborating their knowledge from their independent study and working together in tutorials to resolve the problem.

Well-designed, high-quality problems are a key success factor in problem-based learning initiatives and great attention should be given to problem design (Gijsselaers and Schmidt 1990, Schmidt and Moust ,2000, Azer 2007, Barrett, Cashman and Moore 2010, Jonassen 2012, Hung 2016). Simply put the quality of the problems affects the quality of the learning.

The quality criteria for effective well-designed problems or triggers in problem-based learning are; real-world, authentic, motivating, engaging, activating of prior learning, targeting of new learning, challenging, somewhat ill-structured, multi-dimensional, presented in different media and generative of learning issues and group discussion. (Conway and Little 2000, Gijsselaers 2005, Jonassen & Hung 2008, Barrett, Cashman and Moore 2010, Jonassen 2012, O'Connor 2012, Hung 2016). Quality problems are planned to achieve the learning outcomes and acquisition of the key concepts and transferable skills of the module/ course/unit together with the broader graduate attributes, including teamwork and critical thinking. A meta- analysis of teaching strategies that promote critical thinking indicated that “the exposure of students to authentic or situated problems and examples” had a positive impact on the development of students’ critical thinking (Abrami et al 2015: 275)

This chapter will provide you with suggestions for designing high-quality problems for your students. These suggestions are informed by both the illuminative concept of *the problem as a provoker of a liminal space* derived from analysing PBL students’ talk and my experience of working as an education developer on PBL initiatives across a range of disciplines and countries, where I introduced people to this concept. In order to design more effective problems we need new ways of thinking about the nature of problems. We need new concepts.



The Illuminative Concept of the Problem as a Provoker of a Liminal Space

This new concept of *the problem as a provoker of a liminal space* emerged from a research study (Barrett 2008). The concept of liminal space is from the Latin word *limen*, meaning threshold or boundary (Meyer and Land 2005). A liminal space is an in-between, betwixt and between state (Meyer and Land, 2006). Liminal spaces as in-between spaces have a special function, as sometimes we cannot go directly from an old state to a new state, rather, we need first to go to an intermediary state that is neither the old nor the new. Sometimes people need liminal spaces to learn, to grow, to explore identities, to work on problems and to be creative. Liminal spaces can become places of transition, transformation, stagnation or attempted regression.

Stop and Reflect



- What were some of these liminal in-between spaces in your own life (study, work, research, personal)?
- What did you learn from your experiences in these liminal spaces?

From the data of the research study (Barrett 2008), I interpreted that the two problems in the module provoked liminal spaces for the students. The PBL problems created liminal spaces that challenged students to learn, in order to know more and to move forward, to move “beyond the fields we know ” in the words of the Irish playwright Dunsany (1972). To use a rural metaphor, a liminal space is like a threshold space by the hinge of a rustic gate that marks the space between familiar fields and the start of the fields beyond, a space of possibilities.

Figure 2.2 A liminal Space, a threshold at the hinge of a rustic gate that marks the space between the familiar fields and the fields we do not know (Barrett 2008: 120)



Meyer and Land (2005: 380) argue that: “the connection between liminality, creativity and problem-solving would also merit further enquiry”. This chapter contributes to the existing literature on liminality in learning by exploring the relationship between PBL problems and liminal spaces and its application in the design of problems. This liminal space prompted by the problem in PBL has three dimensions: a knowledge dimension, an identity dimension and a professional action dimension. The PBL problems in the study provoked liminal spaces between 1) current levels of knowing and new levels of knowing, 2) habitual forms of professional action and forms of professional action new to the learner and 3) satisfaction with current identities and a desire to explore other possible identities,.These liminal spaces are seen in the students’ naturally occurring language in the PBL tutorials.

Figure 2.3 The Problem as a Provoker of a Liminal Space: Moving to New Ways of Knowing, Acting and Being (Terry Barrett and Shelly Barrett)



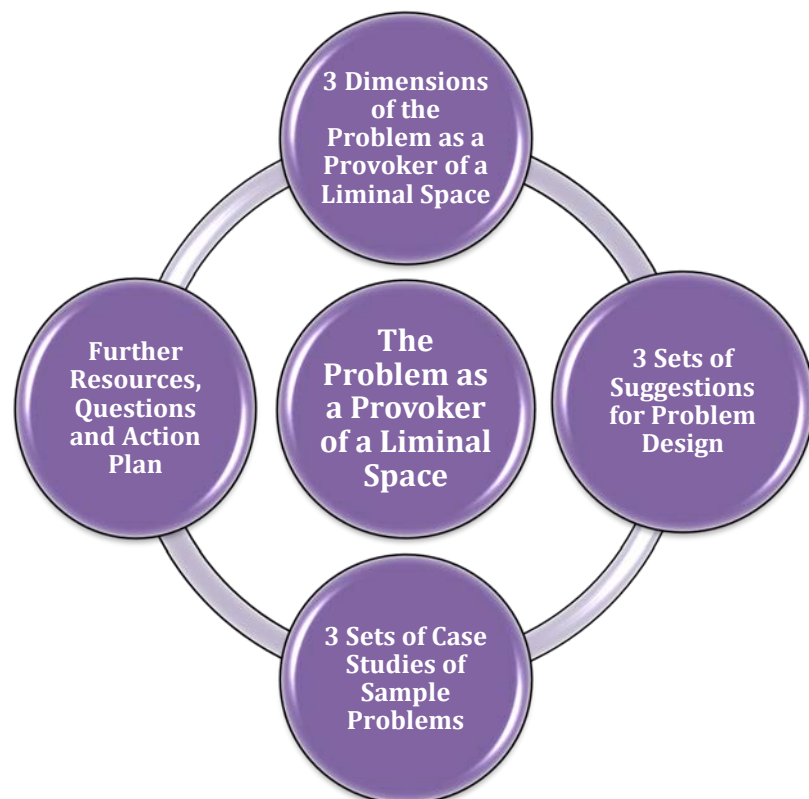
This chapter builds on my earlier presentation of this concept (Barrett 2013). Since then I have developed this concept theoretically and practically by elaborating nineteen suggestions for problem design and providing case studies of sample problems. This concept prompts us to design a set of problems that cover all three dimensions. Some problems may cover all three dimensions and some problems may have a particular emphasis on one particular dimension. Participants in the Finnish and other problem design workshops found that the concept of *the problem as a provoker of a liminal space* inspired them to write new types of problems.

Chapter Structure

Each of the three dimensions of the problem as a provoker of a liminal space (knowledge, professional action and identity) will be discussed in turn as the three major sections of this chapter. Each section begins with an analysis of

the student dialogue in tutorials about the particular dimension. Secondly, practice suggestions for high-quality problem design informed by this dimension are elaborated. Thirdly, sample problems that illustrate these practice suggestions are presented. At the end of the chapter there are questions for reflection and further resources you can use to inform your problem design and action plan.

Figure 2.4 Chapter Structure



The Knowledge Dimension of the Problem as a Provoker of a Liminal Space

In the study, the problems created liminal spaces where the knowledge required for working on them was not obvious and straightforward but unclear and troublesome (Barrett 2008). The students were lecturers, working on problems about problem-based learning. The dialogues quoted in this chapter illustrates how the students could not have resolved the problem with their

existing level of knowledge and that they needed to acquire new knowledge in order to reconceptualise the problem and resolve it. Furthermore, problem-based learning offered students ways of learning that combined professional and personal development in an integrated way of knowing. I gave the pseudonyms Glendalough and Skelligs to the two teams of students.



Students' Talk about the Problem as a Provoker of a Liminal Space between Old and New knowledge

The students talked about three types of knowledge: knowing “that”, knowing “how” and self-knowledge. When the students were working on the first problem they were conscious of the fact that they knew something “about PBL”, but that they had to know more about PBL. The name of the first problem was: “The Professional Body has Spoken”. IBEC is the national organisation of employers in Ireland.

Figure 2.5 “The Professional Body Has Spoken” Problem



The Professional Body has Spoken

Your professional body has come up with suggestions for preparing the professional of the future. They want people with specialist knowledge. However they emphasise that they want people who will not only continue to develop their technical skills but who will also continue to develop their communication, problem-solving, learning to learn and teamwork skills. Your institution’s strategic plan has an underlying theme of “the promotion of the capacity to learn and reason, and of learning skills, as being of greater importance than the changing nature of learning content.” Other colleges have also emphasised the importance of developing key skills. IBEC, have repeatedly stressed that employers are looking for graduates with key skills (e.g. communications, problem-solving, learning to learn. and teamwork) in addition to technical skills.

Your course team is redesigning a total programme using a Problem-based learning approach. You are requested to redesign *your module* using a PBL approach to enable graduates to develop these attributes. Your module descriptor and evaluation plan are due in on 22 October for a team meeting.

You have also been asked to give a 20-minute presentation on your module descriptor, the problem(s), the assessment strategies and your plan for evaluating the module at this meeting.

When the Glendalough team were discussing this problem Noel remarked:

Noel: But the only thing is that we don’t know that much about PBL, we are part of the kernel, not the whole kernel.

Noel realised that he knew something about PBL but that he did not know “that much” about PBL and that he did not know enough about PBL to resolve the problem. He recognised that he needed to acquire more personal knowledge and he needed to find out more “about PBL”. Noel perceived that working on the “Professional Body Has Spoken “ problem (that the students

contextualised in terms of a human resource module) involved naming the space between prior knowledge and the new knowledge required to work on the problem, as he said:

Noel: One of the big things is we organize prior knowledge, what do we know about it, I suppose to some extent what do we know about this interview with human resource management and then, to, eh, to identify the areas that we know nothing about.

The first dimension of *the problem as a liminal space* is the knowledge dimension.

Suggestions for designing problems to maximise the knowledge dimension

Suggestions for designing problems to maximise the knowledge dimension.



1. Design problems around threshold concepts
2. Identify the threshold concepts, learning outcomes, key topics and core transferable skills that you wish the problems to address for a given module/course/unit/programme
3. Design somewhat ill-structured problems
4. Design problems that encourage students to explore the interrelationship of concepts/dimensions/models/theories

Suggestion One: Design problems around threshold concepts

The students in the module grappled with the threshold concept of problem-based learning. I argue that it is imperative to identify threshold concepts and design problems around these as a way of stimulating students to new levels of knowledge. Threshold concepts are difficult to understand, key concepts in a discipline or profession. They are the concepts that once you understand them you think and act in new and different ways. They are:

akin to a portal opening up a new and previously inaccessible way of thinking about something. It represents a transformed way of

understanding or viewing something without which the learner cannot progress (Meyer and Land 2006, 3).

They are the conceptual gateways to the discipline or profession and are considered to have the characteristics of being transformative, irreversible, integrative and troublesome (Meyer and Land 2006).

Figure 2.6 Design problems as portals to new ways of thinking and practicing (Photograph Geraldine O'Neill)



Threshold concepts are the concepts that are easy to mimic an understanding of, but hard to demonstrate a deep and personal understanding of, in ways that show that this understanding can be transferred to different contexts (Meyer 2016). Problems can provoke a liminal space where students encounter a new concept and makes sense of it (Land 2014). Then they have opened a new gate or crossed the threshold of a portal and now have a higher level of understanding.

Figure 2.7 Working on a threshold concept leads to higher levels of understanding



Focusing on threshold concepts is one way of tackling the real danger of too much content overload in modules. In Finland in the introductory lecture, participants were asked to identify some threshold concepts in their discipline around which they could design problems. The following figure identifies threshold concepts in different disciplines from some of the different workshops I have facilitated.

Figure 2.8 Some Threshold concepts in specific disciplines around which workshop participants designed problems

Discipline	Threshold concept
Physiotherapy	Motor learning
Physiotherapy	Stages of tissue healing
Nursing	Person-centredness
Nursing	Aseptic
Nursing	Advocacy
Medicine	Compassion
Medicine	Pain
Immunology	Cell diversity
Chemistry	Moles
Physics	Gravity
Higher education	Problem-based learning
Forestry	Quality of the forest site
Horticulture	Salinity
Career development	Strategic choice
Community development	Participation
Engineering	Design thinking
Business	Body language



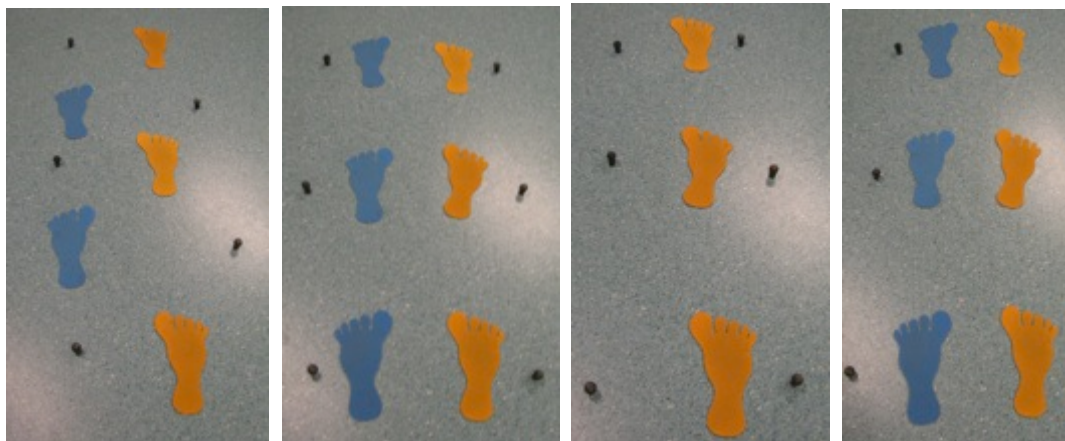
Case Study of a Problem Designed around the Threshold Concept of Motor Learning

In the Finnish workshop a group of physiotherapists designed a problem around the threshold concept of motor learning. They marked out footprints and the prints of a crutch with tape on the floor. The students would then walk on these footprints with a stick as their starting point for learning. The students would experience this problem visually and physically as they walked on the prints with a stick.

Marja-Leena Lahtenmahaki explained that in addition to targeting this threshold concept the problem had the three dimensions of the liminal space. This problem connects the theory of motor learning and the theory of walking with different walking difficulties and techniques of walking. It also connects

these with the practice of using walking aids in different situations and with the way of being with patients and guiding them to use walking aids.

Figure 2.9 Walking with a crutch, Four photos of different floor prints, Marja-Leena Lahteenmahakii, Hannele Anttila and Liisa Sittig



Stop and Reflect



- What are the important threshold concepts for your students?
- If you could only have three threshold concepts for your module/course what would they be?
- What are your ideas about designing problems around these threshold concepts?

Suggestion Two: Identify the learning outcomes, key topics and core transferable skills that you wish the problems to address for a given module/course/unit/programme

You can represent the overall plan for a unit visually by a grid that shows the relationship between the learning outcomes and the problems. I have found if people are working on an old module that already has learning outcomes that

a good starting point is to review and edit the outcomes. Sometimes it is advisable to write them again from scratch looking freshly at the unit and the potential of the PBL process. For example, some people would not originally have had the development of problem processing skills as an outcome but now as the module is a PBL module they may want to write learning outcomes in the area of teamwork, critical thinking etc.

Figure 2.10 The relationship of the problems to the learning outcomes

Learning outcomes	Problem 1 (name)	Problem 2 (name)	Problem 3 (name)
1			
2			
3			
4			
5			
6			

This grid is also useful to demonstrate to others that all the learning outcomes are worked on at least once through the problems and some outcomes are worked on more than once. A key question curriculum designers need to ask themselves is whether the learning outcomes of the module would best be achieved through students working on one large problem or three medium size problems or five small problems or another number of problems that would work in a particular context. Concept maps are useful showing the relationship of the concepts to one another, where the problems are designed around concepts and their interrelationships. Learning outcomes grids and concept maps can operate as effective visual advanced organisers and summaries for the PBL tutors.

It is important to write a problem overview for each problem and these together with the learning outcomes grid/ concept map/topic tree will form the kernel of the PBL tutor handbook.

Figure 2.11 Problem Overview Template

Title of Problem	It is good to give a short or catchy title to the problem so tutors and students can refer to and make connections between this problem and other problems and curriculum inputs.
Authors	It is important that problem designers are given credit for their work. It is also key that the coordinator has the name of the problem designers if the problem needs to be redesigned or updated.
Module/Unit/Course	Name and number.
Date	This helps plan when problems need to be reviewed.
Threshold Concepts/Learning Outcomes/Key Topics/Key Principles/Graduate Attributes	It is very helpful to map this for each problem separately and then for the unit as a whole .
Problem Presentation	It is vital to present the problem exactly as the students will receive it (e.g. word for word, picture by picture). Nothing else.
Enquiry Resources	If you are supplying any additional resources that are part of the problem include them here (e.g. a data set).
Independent Study Resources	Naming key ones here enables planning for student access to these resources.
Problem Implementation	Highlight any practical issues e.g. if this is a progressive disclosure problem what is the plan for students receiving different parts of the problem.
Curriculum Overview	Specify the links and sequencing of this problem with other relevant curriculum inputs e.g. skills training, resource session, research seminar, lecture, work placement. Specify the link between the problem and assessments.
Advice to Tutors	Give specific advice to PBL tutors facilitating teams working on the problem. They may have not all have been part of the design team so elaborate any information or resources they would need.

The third key element that is essential in the tutor handbook is the detailed timetable that shows the links between working on the problems in PBL tutorials and other curriculum inputs. This can be shared with students so that they can see the sequencing of all the curriculum inputs e.g. PBL tutorials,

workshops and research seminars and take the responsibility for actively using all of these to progress their work on the problem and their understanding of the interrelationship between the key concepts they are exploring.

Suggestion Three: Design somewhat ill-structured problems

Problems should be deliberately somewhat ill-structured to allow different resolution pathways. They should resemble the messiness of real life problems. Two important first steps in knowledge acquisition for students are *defining the problem* and *naming the research questions* they want to do further work on to resolve the problem. It is crucial not to define the problem exactly in the problem presentation but to leave it somewhat ill-structured. Problem designers are advised not to put questions at the end of the problem presentation. Rather it is the students' job to identify their learning issues and phrase these as questions. Sometimes in problem design workshops, groups have included questions in the first draft of their problem. The level of ill-structuredness will vary with the stage of learning and the contexts of the course.

Suggestion Four: Design problems that encourage students to explore the interrelationship of concepts/dimensions/models/theories

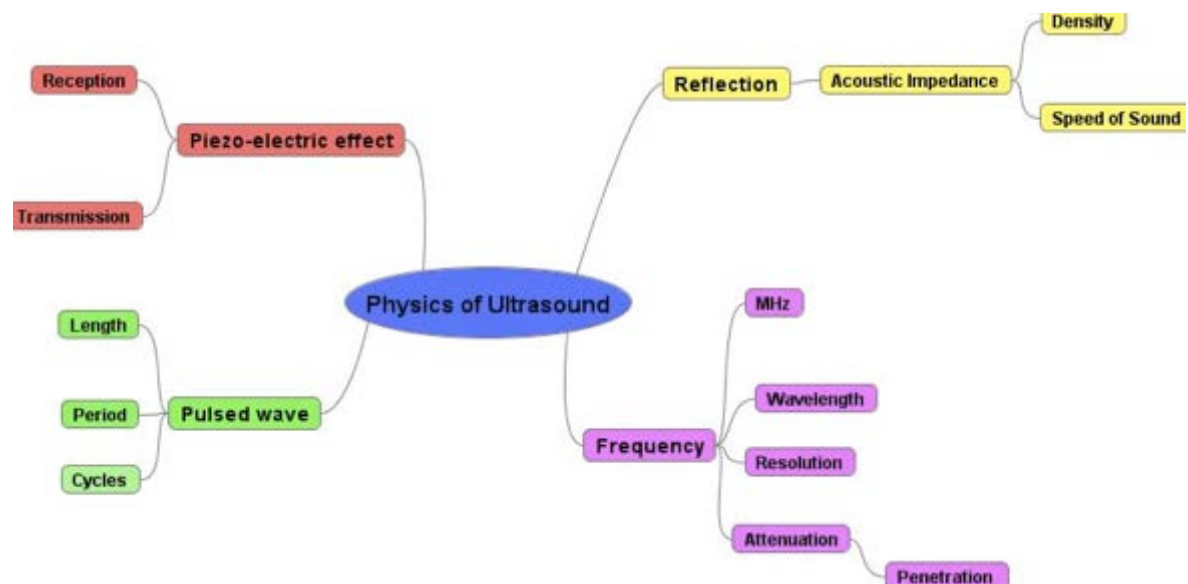
Problem-based learning is a total multi-dimensional approach to learning. In 'The Professional Body Has Spoken' problem, students are prompted to explore the interrelationship between different dimensions of PBL e.g. between the problems and assessments. In addition to dealing with practical work situations, some problems should prompt students to grapple with understanding key concepts and their interrelationships. This conceptual understanding provides the foundation and rationale for their work. Two useful problem types that are particularly useful for this work are incomplete concept maps and contrasting texts. Contrasting text problems can take the form of two letters to the editor from different viewpoints or two opposing journal papers.



Case Study of a Problem on the Interrelationships of Concepts in the Physics of Ultrasound

The following problem is from a masters programme in ultrasound and it encourages the students to explore the key concepts of the physics in ultrasound and to name the relationships of these concepts by adding in appropriate link words on the lines and expanding the concept map. Developing this incomplete concept map further facilitates students' conceptual understandings and the relationships between these concepts and their clinical practice.

Figure 2.12 The Physics of Ultrasound, Marie Stanton



See the further resources section at the end of this chapter for more information about concept maps. In addition to designing problems that focus on “knowing that”, problem designers should create problems that use the

potential of PBL problems in developing the “knowing how’ capabilities needed for professional practice.

The Professional Action Dimension of the Problem as a Provoker of Liminal Space

The students talked about different aspects of the professional action dimension: professional skills; self-reflection; ethical behavior and changing the approaches to professional work when new knowledge and insight became available. They talked about the professional action dimension of the problem in terms of developing key professional transferable skills or “know how” (e.g. communications, teamwork). This “know-how” was developed both through the content of the problem and the process of working through it.



Students’ Talk about the Problem as a Provoker of a Liminal Space Between Habitual and New Forms of Professional Action

Kate, a member of the Glendalough team, was aware that they needed new personal knowledge and they needed process knowledge:

Kate: We now believe that we don’t know “that”, we don’t know “how” (laughter)

While working on this first problem, Sue developed her teamwork skills and her ability to relinquish individual control:

Sue: I have learnt a lot about teamwork...Can I let go a little bit more, yes I can.

Working on this PBL problem prompted Sue (as a PBL student) to move from her current level of teamwork skills to new levels. After the module she developed her teamwork skills further by encouraging her PBL students to work as teams and relinquishing her control of the teams, more than in her previous approach to group work. Developing new teamwork skills is crucial. This links with Eraut’s (1994) argument that learning to work effectively in

teams is often inadequate in professional education. This type of process knowledge is “essentially knowledge of how to do things and how to get things done” (Eraut 1994, 93).

Students’ talk about The Professional Body Has Spoken”

Problem

I now focus on the students’ talk about working on “The Professional Body Has Spoken “ problem that involved them designing problems for a module for other students (see Figure 2.5 for full text of the problem). Students in the Skelligs team were in the process of debating what the problem was about and engaging in problem definition. The students chose to rewrite the problem in terms of the context of a module on professional and personal development for a nursing programme that one of the students was teaching. They later decided that other lecturers could adapt this module in their contexts. In the following extract, the Skelligs team was talking about designing problems for a module on professional and personal development for nursing students.

Betty: Isn’t personal not characterised in professional, within a professional setting its how you conduct yourself within a professional setting, its context.

Hanora: That is it, that is it. Yeah, I personally...*(laughter)*.... I don’t think we can, for me I can’t separate the two because I have seen a huge leap for me on a personal level and I have brought that, how I have developed as a person in relation to my lifelong learning techniques. I know I have developed in my critiquing ability or my reflective ability, which has been huge for me lately. And I am so glad that I was, that part of the course was there for me. And I have been able to bring that, consciously into my job because I can maybe see things in a different light and say hang on, I am not too happy. I am no longer so accepting because somebody has helped me develop a lateral vision and I can now look at things, I am not afraid to maybe think laterally and confront, if that is what it is. If you have to confront. The course for me personally has gone right into the professional development and maybe that is why in this particular area of nursing that you can’t separate the two of them. Maybe in other areas you can, but here they are married together. I think they are incredibly good, because the person in this context does refer to me, impinge on how people develop and progress and behave professionally. That is how I feel, that inner personal strength.

The major theme of how the Skelligs team talked about the problem was in terms of: “Problem: Professional Development versus Personal Development.” The Skelligs team argued that the problems they were designing for this module would go “beyond skills” to develop “that inner personal strength”. In other words, professional skills are not merely a question of technical know-how but involve the integration of personal knowledge and the embedding of appropriate attitudes. A key to being a professional is continually developing “reflective” and “critiquing” abilities in order to self-assess your own work and colleagues’ work as appropriate.

The professional action dimension of the problem as a provoker of a liminal space is that betwixt and between space, between habitual forms of professional action and forms of professional action new to the participant. So the professional action dimension is not only in terms of developing professional skills but also in terms of major professional attitudinal change. As one participant working on a problem in the module said during a tutorial:

Mary: Well I just feel this is going to challenge me to change. Profoundly change my approach to teaching.

The professional action dimension of the problem in this module was present because the participants were full-time lecturers who were engaged in the professional practice of teaching in higher education and were doing this module on a part-time, professional development basis. The extract of the student dialogue illustrates this dimension by showing how working on “The Professional Body Has Spoken “ problem was challenging Mary to change the professional action of her teaching. Frank talked about working on the problem as prompting the participants “to change from old style teaching to problem-based learning”. Part of working as a professional is being able to adapt critically and creatively to change and to be open to changing current ways of working.

Suggestions for designing problems to maximise the professional action dimension

Professionalism has been defined as having three elements: knowledge, empathy and self-reflection (Olkers et al 2007). Professional action is planning and carrying out actions in ways that combine these three elements.

Designing problems to develop professionalism must therefore move beyond students being challenged to show that they can apply their knowledge but also that they can do so in ways that demonstrate empathy and the habit of continuous self-reflection. I share a number of suggestions for expanding the professional action dimension of problems and triggers. Choose from these according to your context.

Suggestions for designing problems to maximise the professional action dimension



5. Design a set of problems with an awareness of the range of problem types
6. Design problems in a range of media
7. Push out the boundaries of what constitutes a “real-life” problem
8. Combine problem-based learning with action learning
9. Involve key stakeholders in designing and reviewing problems together with assessing problem outputs
10. Design inter-professional problems
11. Design problems connected to work placements
12. Design problems with professional ethics elements
13. Design problems to enhance empathy and compassionate action.
14. Plan the integration of the problems with the other curriculum inputs of the module/unit.

Suggestion Five: Design a set of problems with an awareness of the range of problem types

Problem designers need to be cognisant of not repeatedly designing the same type of problems but rather designing problem types across the full repertoire appropriate to the profession. Jonnassen (2011:11) elaborates eleven kinds of problems and this prompts us to design new types of problems:

1. Logic problems
2. Algorithms
3. Story problems
4. Rule using/rule-induction problems

5. Decision making
6. Troubleshooting
7. Diagnosis-solution problems
8. Strategic performance
9. Policy-analysis problems
10. Design problems
11. Dilemmas

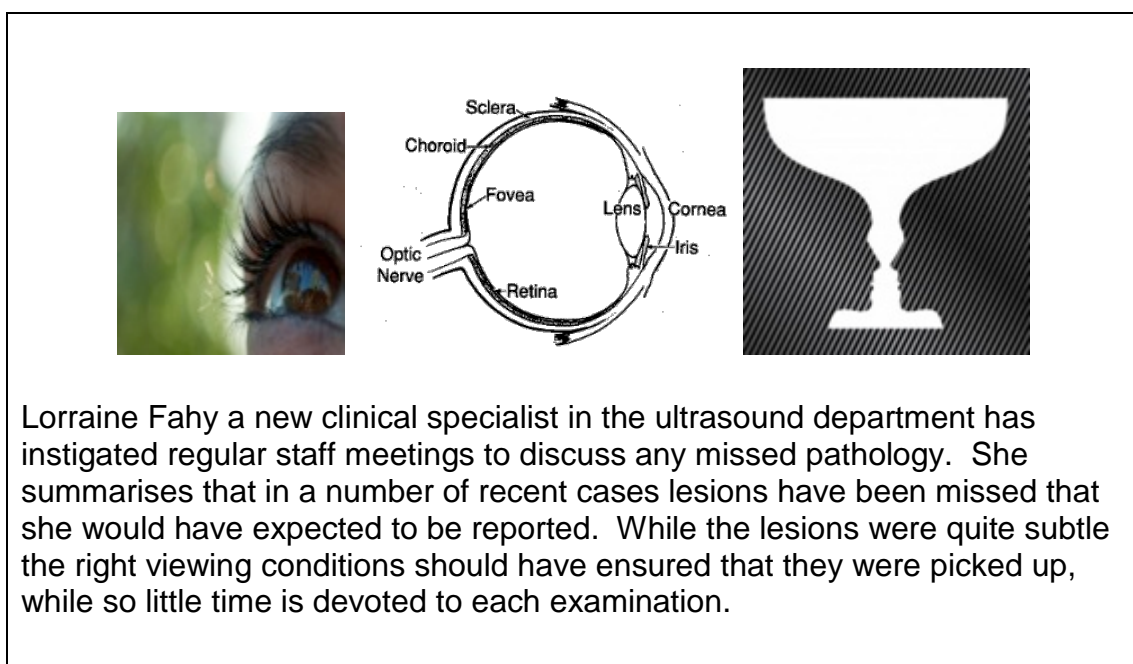
We can use this understanding of the range of problem types to design a variety of problem at different levels of structure, challenge and complexity to stimulate students' interest and professional development. For example in problems for health science professionals the problems should not only include a diagnosis-solution element but also other problem types.



Case Study of a Problem that includes different types of sub-problems

The following problem given to students on a Masters in Ultrasound programme incorporates dilemmas, troubleshooting, policy-analysis and decision-making sub-problems.

Figure 2.13 In the eye of the Beholder, Marie Stanton



Mary agrees and says that accuracy would improve with longer time slots. Jim agrees with Mary & Anne. The Imaging Services Manager states that this is unacceptable, a lot of work has gone into setting times for examinations and they are in line with international standards.

Maeve also states that she thinks the time slots are very short, but she also thinks that the viewing conditions in the ultrasound rooms are not ideal. Other staff join in stating that the viewing monitors in various offices are not great either and maybe this contributes to missed pathology.

The Imaging Services Manager suggests that a working party be formed to review the viewing conditions in both the ultrasound examination rooms and on any monitors used in departmental offices. She states that funding will be found to make improvements, if sufficiently strong evidence is put forward that accuracy could be improved by optimising viewing conditions.



Suggestion Six: Design problems in a range of media

In professional life problems present in different media e.g. a phone call, an e-mail etc. Professionals also use different media in working through a problem and in presenting the solution to others. Student learning is stimulated by variety in the media of the problem presentations. The following diagram shows some of the different media that you can use to design problems.

Figure 2.14 Designing problems in different media



In the workshop in Finland the participants were stimulated to design problems in a range of media. One group decided to use an audio clip of a physiotherapist doing an assessment with a patient. This was to get the students focusing on the language and communication between the physiotherapist and the patient. In the same workshop, a group from a business programme decided to use a video clip of a negotiation between two teams to act as a trigger to learn about verbal and non-verbal communication in negotiations.

Some problems are designed as progressive disclosure problems as a number of disclosures are revealed one after the other to reflect the sequence in professional practice. These problems lend themselves to using a range of media for the different types of disclosures.



Case Study of a Progressive Disclosure Problem in Speech Pathology

The following is an abstract of a speech pathology problem designed by Ingrid Scholten, Flinders University, Australia, that uses progressive disclosure

Figure 2.15 Mrs Mc Crea Problem abstract, Ingrid Scholten Flinders University, Adelaide, Australia

Mrs. McCrae is a 65 year-old woman who presents to speech pathology at a relatively advanced stage of bulbar onset motor neuron disease. Students explore issues related to clinical and instrumental assessment of swallowing in this context. As the case unfolds students explore the nature of the declining communication and swallowing and appropriate strategies for intervention, including artificial feeding and respiration and augmentative and alternative communication (AAC). Students meet Mr. and Mrs. McCrae via a series of video clips in which they discuss the impact of the disease. They also access authentic videotape of instrumental swallowing assessments in order to determine the nature of the disorder as a basis for intervention planning.

The case provides students with the opportunity to briefly explore the concept of death and dying and their own reactions to the death of a client they have come to know in some depth.

The first tutorial evolves through 4 disclosures and focuses primarily on the impact of the condition on the client and her husband and assessment of the presenting swallowing difficulty. Early in the tutorial students watch a short confronting ad (Sarah's Story) about MND (www.sarahsstory.org.uk -- http://www.youtube.com/watch?v=4b-h_XBArC4). They are prompted to reflect on their own reactions to the video and to consider the producer's reasons behind the provoking imagery used.

Clinical assessment reveals significant dysarthria and dysphagia (speech and swallowing difficulties), with Mrs. McCrae requiring communication augmentation and a modified diet of soft and pureed solids, mainly to cope with swallowing inefficiency. Mrs. McCrae copes well from a safety perspective, possibly because of the intact sensation associated with the disease.

There are 3 disclosures in the second tutorial, which introduces students to instrumental assessment of swallowing via Fibreoptic Endoscopic Evaluation

of Swallowing (FEES), the importance of client-centered practice and the ongoing management of speech and swallowing in MND.

The final tutorial includes three disclosures that deal mainly with the issue of preparing for death and the professional burnout that clinicians need to guard against when working in a demanding role with a population who will not recover and will die in a potentially distressing way, often after long-term regular and intimate contact.

A problem can contain a range of different media and the students are prompted to use the combination of these presentations as starting points for the explorations of the problems



Case Study of a Science Problem using a Mixture of Media:

Figure 2.16 The dopamine vs. glutamate debate by Craig Slattery, Elaine Keogh, Keith Murphy, Terry Barrett and Kathy O'Boyle

John's brother Kevin had his first breakdown at the end of final year in school. John wasn't surprised – he had seen that his brother was becoming increasingly isolated, paranoid and convinced that their parents were trying to control his thoughts. It took a while for Kevin to get the help he needed; he had to be hospitalized on two occasions but eventually he was diagnosed with schizophrenia and prescribed neuroleptic medication, which seemed to work, although there were a lot of side effects.

John was often angry with his brother for disrupting the family home; however, his strongest emotions were concern and fear. In trying to understand what had happened to his brother, John began to search the internet and found this video clip which he found useful:

<http://www.dnalc.org/view/814-Dopamine-Hypothesis-of-Schizophrenia.html>

Around the same time, a friend of John's who was studying in England posted a link on his Facebook page to a newspaper article.

Cambridge students paid £250 to take horse tranquiliser drug ketamine 'for schizophrenia research'

By [DAILY MAIL REPORTER](#)

UPDATED: 13:38 GMT, 21 December 2010

Read more: <http://www.dailymail.co.uk/news/article->



[1340473/Cambridge-students-paid-250-horse-tranquiliser-drug-ketamine-schizophrenia-research.html#ixzz3A502SVuP](https://www.dailymail.co.uk/1340473/Cambridge-students-paid-250-horse-tranquiliser-drug-ketamine-schizophrenia-research.html#ixzz3A502SVuP)

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John was able to find out that ketamine affects the neurotransmitter glutamate and the research was designed to investigate treatment methods for schizophrenia. John's first thought on reading the article was that what these students had done was very dangerous but then he wondered whether the research might actually result in better drugs for treating patients like Kevin.

Groups must be ready to debate either side of the motion "That the FDA should limit future development of anti-psychotic drugs to those targeting dopamine" and on a specified date in November. The debate will be adjudicated by a panel of assessors consisting of a former senior executive of a leading pharmaceutical company and by a current professor of Drug Delivery.

Sometimes a physical object can be a strong trigger for learning. You can touch the different parts of it and see it in three dimensions.



Case Study of an Education Problem using a Physical Object

In a module on learning theories where I was a tutor, another tutor Alison Clancy suggested that we use a plastic model of the human brain as a problem trigger.

Figure 2.17 Problem trigger of a plastic model of the brain



This stimulated students to look at what parts of the brain are associated with different elements of learning and to explore what neuroscience can teach us about learning.

Stop and Reflect



- What different types of media would you like to use to expand your repertoire of ways of presenting problems to students?

Suggestion Seven: Push out the boundaries of what constitutes a “real-life” problem

Two design lecturers encouraged the professional and personal development of their students by giving them the same real-life design brief problem that designers from a London design company were working on (Duggan and Dermody 2005). They then brought the students to London where they did their presentation alongside the employees of the design company. It is interesting the way that they have pushed out the boundaries of what constitutes a “real-life” problem. I would argue that by moving beyond simulated problems in the classroom to problems that are “real-life” that it is possible to develop students potential in ways that combine personal and professional development.

Stop and Reflect

- What are your ideas for pushing out the boundaries of what constitutes “real-life” problems that would work in your contexts?

Suggestion Eight: Combine problem-based learning with action learning

Problem-based learning began by bringing students nearer to professional work by bringing simulated problems into the classroom. But now we can extend the professional action dimension of the problem by designing problems that necessitate students carrying out professional work outside the classroom:

Finally a challenge for all of us as learners in PBL, Barrett challenges us as facilitators to extend our role to that of educators of social

empowerment and as such to go beyond developing responses to simulated problems to carry out action in social contexts.
(Little and Kandlebinder 2001, 8)

A senior youth worker was working with a group of youth workers. He got each person in turn to bring his/her current problem in the form of a picture. Then the group worked on the problem using a problem-based action learning approach, helping the youth worker to plan his/her interventions and to report back and discuss how the planned intervention went. At the end of this process the youth worker did a second drawing of how he/she saw the situation then. Real-life problems that require professional or social action outside the classroom are larger problems that require more time than the smaller problems traditionally used in PBL. The dividend in terms of the development of professionalism is well worth the planning work.

Suggestion Nine: Involve key stakeholders in designing and reviewing problems together with assessing problem outputs

It is possible for a lecturer to design problems on her/his own but in my experience when a mixed group of stakeholders design the problems in small groups the problems are often very engaging, challenging and creative. The stakeholders that participated in problem design workshops I have facilitated included lecturers, post-doc researchers, workplace supervisors, professionals with different specialisms, recent graduates, students, librarians, education developers and education technologists. Students can be particularly gifted at designing problems that are engaging and up-to-date.

A key element in the problem design workshops is the peer-review of problems. When I facilitate the peer-review of the problems I use the following steps

1. Auto positive

I ask the team who designed the problem to give themselves positive feedback e.g. "What are you happy about in the design of this problem?"
How will the problem facilitate student learning?"

2. Other positive

I then ask others in the workshop to give the team positive feedback and I join in on this discussion

3. Auto developmental

Next I ask the team to give themselves developmental feedback e.g. “How would you like to develop or improve this problem?”

4. Other developmental

Then I ask others to give the team suggestions for developing the problem and I join in on this conversation.

5. Final positive note

I end the review by highlighting the positive elements of the design of the problem.

Stanton and McCaffrey (2010: 47) outline an approach to facilitating a multi-stakeholder problem design workshop with the following suggestions:

- Identify briefs and elements for problems
- Identify and invite contributors
- Construct a preparation pack and send it to participants
- Set the tone
- Provide a keynote address
- Describe the context
- Explain the requirements for designing quality problems in different formats
- Construct small multidisciplinary groups
- Manage the groups
- Seek small group feedback
- Summarise the outcomes and experience with the whole group

Stop and Reflect



profit or non-for profit organisations in assessing your problem outputs?

- What stakeholders do you plan to involve in your problem-design workshops?
- Why have you included these stakeholders and excluded others?
- How might you involve professionals from

What about students writing their own problems? On one part-time PBL management course academic staff and professionals from industry designed the first set of problems. In the second semester the students who were all mature students on a continuous professional development programme designed their own problems. I facilitated a writing group for doctoral students using a problem-based learning approach. All the students brought the current dilemma or problem they had with writing their doctoral thesis. We worked as a team on each of these writing problems. Then they did work on their writing and the specific chapter was then peer-reviewed by members of the writing group.

In the research study, Kate who designed problems for her postgraduate marketing programme said that she brought some people in from industry, including a senior executive from one of the biggest sales and marketing agencies in Ireland, and that this person was fascinated by observing students in a tutorial and amazed at the high standard of the end product they produced and the way the students worked. I worked with a culinary arts team who designed a PBL module. For their assessment they had to present their tender application to provide catering facilities for a chain of health clubs (which was a product they developed from working on a problem) to a panel that included a manager of a health club.

Suggestion Ten: Design inter-professional problems

As professionals work in inter-professional teams it is helpful that students have the opportunity to work on problems inter-professionally and consider problems about inter-professional teamwork.



Case Study of a Health Science Interprofessional Problem

In University College Dublin there is a “Collaborative Learning for Health Professionals “ module in Health

Sciences. Students from medicine, nursing, physiotherapy and diagnostic imaging, work together on health science problems. The aim of this module is to “encourage collaboration by educating students from different professions together” (Cusack et al 2012: 31). Problem-based learning has been found to be an effective method for students learning collaborative skills (Cusack et al 2012; L'Ecuyer et al 2015). The problems are about health issues, patient cases, teamwork and understanding the roles of different health professionals in patient care. Here is one of the problems the students worked on.

Figure 2.18 Problem 5

Oh..... I Must Have Grown Up!

Rathmines Community College,
Rathmines,
Dublin 6.

8th November 2015

Dear Aoife,

It was very nice of you to visit us in the school recently. We were delighted to hear that you achieved your goal and gained a place in UCD to study Medicine. We were all aware how hard you worked and it was without doubt a great achievement to succeed in gaining a place. We wish you well in your studies.

When we spoke recently I recall that you mentioned that you had selected a 'Collaborative Learning' module as your elective. I believe that you said that you were working with other students undertaking courses in a variety of programmes including nursing and physiotherapy.

As you know we have a Careers Day for all 5th and 6th Year students in November of each year and there is always a great interest in health related careers. Students always respect information delivered by their peers more so than by those of us who have been out of the third level education loop for some time. I was wondering would you and your fellow students consider giving a short presentation describing the UCD Health Care Programmes represented by the group and giving the 2nd level students a flavour of how the programmes are similar and how they differ. I would be grateful if your group could explore how these programmes will prepare you for future employment.

I look forward to hearing from you.

Regards,

Peter Smith, BSc, H Dip.

Principal

Suggestion Eleven: Design problems connected to work placements

Many programmes have work placements and problems should be planned to link directly with other curriculum elements, including placements. Problems that are part of a pre-placement course can prepare students for some of the common challenges they may face in the work situation. In addition problems can be designed around issues of being a student on placement, work-based learning and supervision. Students can bring back problems from work placements to be worked on in class.

Suggestion Twelve: Design problems with professional ethics elements

We design multi-faceted problems that reflect the multi-dimensional nature of real-life problems. So as many professional problems have an ethical dimension then designers should be mindful to design problems with ethical elements. These can be mapped across courses to ensure that all the major ethical issues are addressed. Many countries have had major crises stemming from lack of ethical behaviour. PBL is fertile ground for students developing their ethical behaviour as they work through messy problems with many elements including ethical ones.

Suggestion Thirteen: Design problems to enhance empathy and compassionate action

Empathy involves sensing the perspective and feelings of another person, “understanding or reconstruction of another person’s emotion” (Lussier and Richard 2007: 640). Developing empathy is key to effective communication in professional and personal life. Empathy is a pre-requisite for but not synonymous with compassion. “Compassion” is defined by the Merriam-Webster dictionary as a “sympathetic consciousness of others’ distress together with a desire to relieve it”. Compassion goes further than empathy as it includes a desire to relieve suffering. Compassionate action goes further again to involve responsive action.

Compassionate action can be future and globally orientated as well as present and individually or small group orientated. Gilbert (2010:16) stresses that it is also important to remember that:

Compassion is not just about being reactive to things that have happened but also about ‘trying to create’ for the future and so problems can be designed about how we might live collectively given the limited resources the earth has.

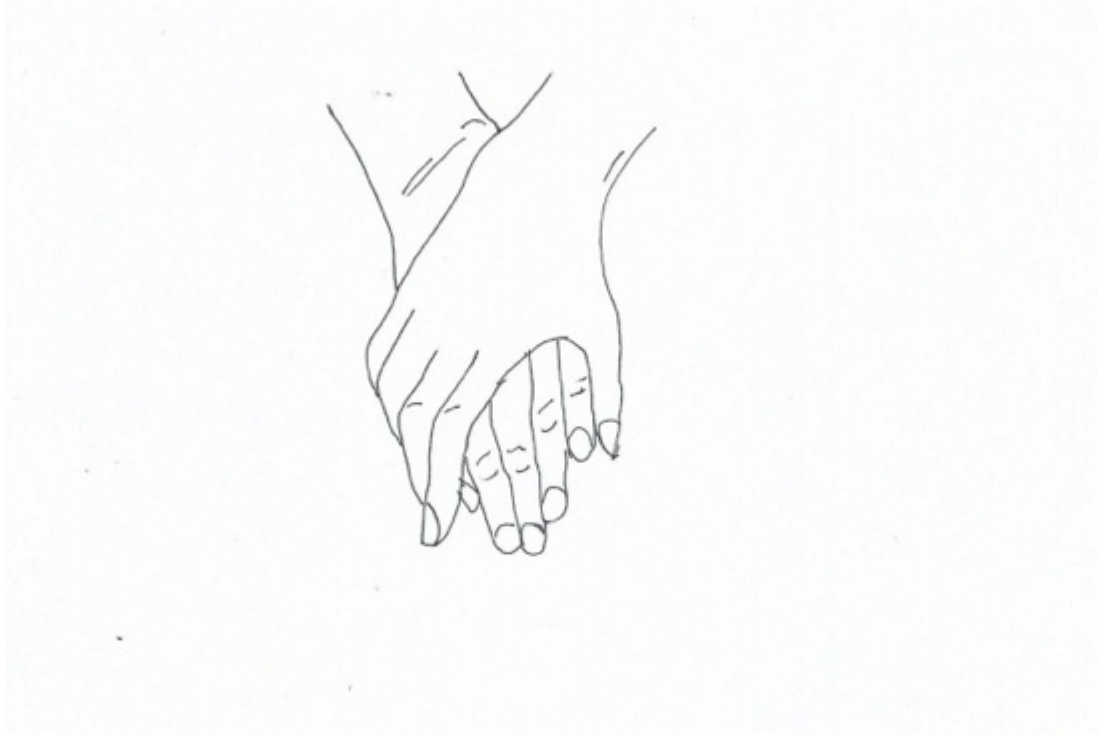
In health care, empathy and compassion are vital as they improve patient outcomes, patients look for them and this leads to greater satisfaction for professionals (Derksen et al 2013). We need to be mindful to design problems to enhance empathy and compassion for students from all disciplines not just the health sciences. In different forms of professional practice and different aspects of social life it is vital to be able to see and feel a situation from the perspective of the “other” or the “customer” to be able to respond with this understanding, and to enjoy the resultant satisfaction (Barrett and Naughton 2016). Compassionate response has three dimensions emotional, cognitive and action. Salzberg (1995) deliberately uses the words “compassionate response” rather than compassion to highlight the key element of responsive action.



Case Study of a Problem about Compassion from a Nursing Module

A group of nursing lecturers who were working on designing problems for a module on caring, compassion and communication decided to use a sketch on one hand caringly touching another hand as a trigger to explore what compassion in nursing means. Shelly Barrett has drawn a similar drawing as an illustration

Figure 2.19 Hands, Shelly Barrett



Remember to include problems on self-care and self-compassion as well as compassion for others. The following video-clip is used widely as a trigger for work on compassion for others and self-compassion.

Figure 2.20 Cleveland Clinic Youtube Video on Empathy

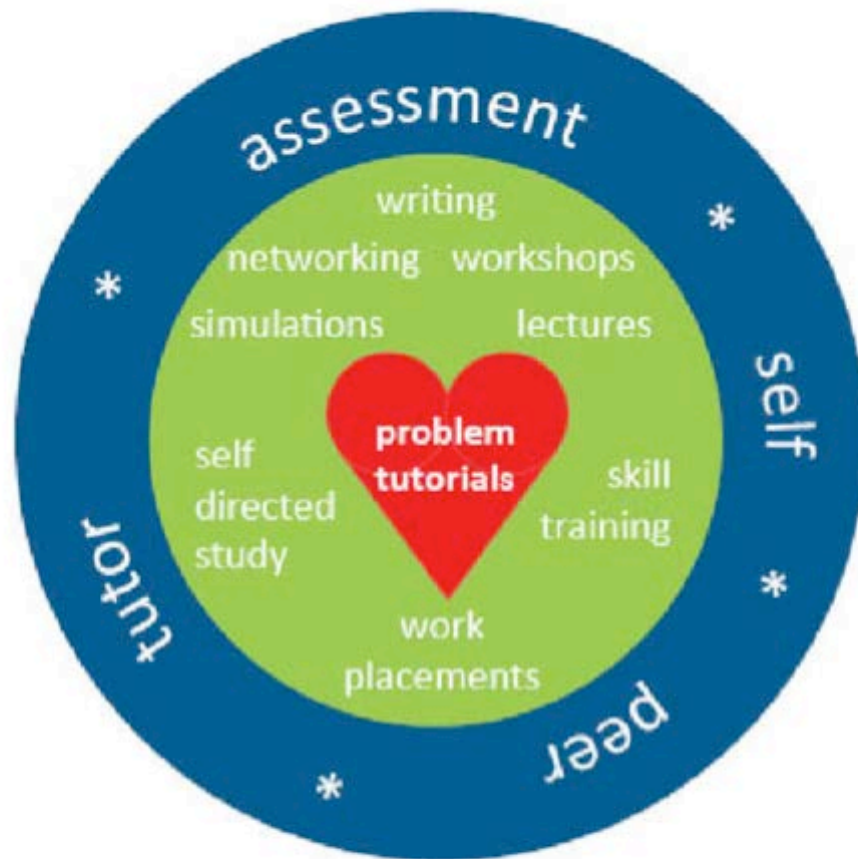
Empathy: The Human Connection to Patient Care

https://www.youtube.com/watch?v=cDDWvj_q-o8

Suggestion Fourteen: Plan the integration of the problems with the other curriculum inputs of the module/unit.

Some people think in error that a PBL module consists merely of students working in tutorial groups on problems. Rather it is crucial to view PBL as a total approach, where the problems drive the sequencing and content of other curriculum inputs e.g. skills training, lectures, workshops, research seminars, work placements, resource sessions etc. The heart of the PBL curriculum is PBL tutorials where students work on problems in small teams, but this is not the entire curriculum. The problems and the curriculum timetable need to be designed to prompt students to make links between the problems and the other curriculum inputs. Tutors and students can be presented with visualisations that encourage them to see the totality and coherence of the unit and to make connections between the different elements of the unit: the problem, other curriculum inputs and assessments.

Figure 2.21 A Total PBL Unit



Wagner et al (2007) argue that professionalism is also about the acquisition of a new identity in life with all the associated rights and responsibilities. The next section considers the identity development potential of PBL problems.

The Identity Dimension of the Problem as a Provoker of a Liminal Space

In the study, the participants talking about the problem, talked about being in a space between old and new ways of being in the world and old and new teacher identities. The space provided by PBL problems in the module encouraged active learning by the participants, who were interested in the problem as *their* problem. They explored their identity and their sense of being, at many levels, including being a PBL student, being a lecturer, being in higher education and being in the wider world.

Participants not only engaged with the problem in terms of knowledge but also in terms of their identities, their sense of being. One team moved from seeing the problem as “their” problem, “about them” to seeing the problem as “our” problem, about “us.”

Mary: I just wonder how much of it is about the change in us in our...is it about us or is it about them, I just have this problem. Are we calling this, is it about what we are going to learn or is it about what we are going to try and reorganize for the students. I don't know whether to posit this in terms of what we as a group are going to learn or what we are going to produce.

Noel: In a way we are the students. We are going through the process for the first time.

Identity is about positioning and this positioning happens through language. The Glendalough team talked about the problem in terms of “about them” versus “about us”. Identification is one of the major types of text meaning, in terms of people expressing their “ways of being “ in the world (Fairclough,

2003, 27). Pronouns are associated with the dimension of solidarity or social distance in social life (Brown and Gilman 1960). The use of “them” implies greater social distance than the solidarity expressed by “us”. The participants were talking about the problem being about “them” and about “us.”

I think that problem-based learning has been used well for knowledge and professional development. However identity development has not received the same attention and level of discussion. Betty stated that curricula should provide spaces for students to engage with “the inner concept of themselves” and argued that curricula in professional education should also be about self-awareness, self-development, and the management of self. Further, Betty argued that it is important that higher education should focus on enabling students to develop their sense of self; that is, to have the space to become and to know who they are. Being aware of how they present themselves to others in their everyday working life and of what is happening when they are getting on, or not getting on with people are key elements in this process. She argued that students should not just learn specific work processes but should know these work processes in such a way as to be able to adapt them to their personal styles.

Betty: I think you mentioned something that is quite important, it’s that inner concept of themselves. I think that is really, really important in any discipline, in architecture, in design. Where you know the processes you work through, you know how you get on with people, or not. And being able to counter that or to be able to see yourself within that context is very important.

The participants talked about how the debate of professional development and personal development was still being worked through in their practice and had been influenced by their experience of the PBL module. At the participant validation session where the team was presented with the data analysis, Beatrice elaborated:

I think a lot of the time design courses have been very directive. A lot of the time you would see the hand of the tutor all over the work...I'm sure it happens with writing theses. Having been through that system myself, I don't think it has the interests of the student at heart, it has the interest of the tutor at heart... And you made the point further down that what people are most interested in is themselves and their personal development. And, eh, I think that is true. That's another part of it you actually give it over to the students and let them....

For me, seeing the “hand of the tutor all over the work” at a final year art and design exhibition is obscene and the opposite to the tutor encouraging students to develop their own sense of identity and style as an artist. Beatrice talked about using ill-structured, open-ended PBL problems with her design students in a way that gave them space to become more self-aware and to develop their own style rather than imitating the tutor's style.

Questions of identity are so crucial: Who am I? What do I value and why? How can I express my values and identity at work? What type of a professional and person do I want to be? What styles of working do I prefer? How is the identity of my profession changing? How is my national or international identity important to me? Here are some suggestions for you to choose from for consciously designing problems so that students engage in identity work and for maximizing the potential of problem-based learning for identity development.

Suggestions for designing problems to maximise the identity dimension

Suggestions for designing problems to maximise the identity dimension



15 Write students into the problem so that they identify with the problem

16 Design problems about career development and job seeking

17. Include problems about the identity of new disciplines/therapies/ professions or the changing identity of professions

18 Design problems about issues of national or international identity

Suggestion Fifteen: Write students into the problem so that they identify with the problem

One way of helping students identify with the problem is writing students into the problem in their professional or student role. In the module of the study one of the problems began with “Your professional body...” Other examples of this approach are “You are a third year student on placement and...” “ As a group of consultants you have been asked to... “Your manager has requested that...” ”You are a project team that...” “Your team have chosen a particular approach and style...”

Suggestion Sixteen: Design problems about career development and job seeking

Problems can be designed to give students spaces to explore what type of professional, creative person or team member they want to become and what their individual emerging areas of interest, specialism and style are. Students are concerned about employment and career issues. Problems on these topics can provide them with the space to explore these key issues and to learn from researching them and discussing them with their peers. These can include problems about searching for a job and different job opportunities. They can be embedded in professional practice and other courses rather than left totally to the careers service. Research has indicated that problems about

career interest promote motivation and engagement with the PBL process (Hung 2016).

Suggestion Seventeen: Include problems about the identity of new disciplines/therapies/ professions or the changing identity of professions

Furthermore, problems about the nature of new disciplines/ professions/ and the changing identities of specific professions internationally can be designed.



Case Study of a Problem about the Identity of Equestrian Assisted Therapy

Barbara Murphy designed a new module on equestrian assisted therapy at University College Dublin that is an open elective and includes agriculture, physiotherapy and psychology students. As this is a relatively new therapy the first problem was about understanding the nature of equestrian assisted therapy. Equestrian assisted therapy offers innovative, holistic approaches whereby the horse acts as a medium in the support of clients with special therapeutic and learning goals. The students receive the following pictures in a progressive disclosure mode one after the other.

Figure 2.22 Problem 1



What's next....?





Suggestion Eighteen: Design problems about issues of national or international identity

For many people there are links between their professional identities and their national or international identities.



Case Study of a Problem About the Role of the Forests in Finnish National Identity

In Finland the forests are key to national identity. At the Finnish workshop the forestry group decided to write a problem about the history of Finnish forests and society.

**Figure 2.23 Abstract of Forest and Society Problem by Eveliina Asikainen,
Tampere University of Applied Sciences**

The problem begins with a visit to Seitsemien National Park, in Finland. In the heart of the park there is an old forest ranger's cottage, made of logs, furnished and equipped in early 20th century style. The ranger plays the part of a tenant working for the landlord and cultivating his own fields as best he could.

We start the visit by taking the students to the biggest room of the cottage and start a play. One of the teachers plays the forest owner who has started a sawmill and demands greater amount of work and logs. The tenant is concerned about the work should do to get wood to fix the wooden fences etc. His children are around eating porridge with wooden spoons from wooden bowls. The landlord shows his new axe for marking the trees to be cut and marks the trees telling the tenant what to do commanding him to follow. Irritated but helpless the ranger follows.

After a little while an artist and a poet enter the cottage asking to stay a while and follow the everyday life in the cottage. They are interested in the simple toys, and all wooden everyday items around. The tenant's wife wonders what all this is about but finds some room when the guests are prepared to pay and they show some food they have brought with them. We play some Sibelian music in the background.

Eveliina explained that in the late 19th and early 20th century there was a national romantic era when artists, composers (including Sibelius) and authors travelled the Finnish countryside and recorded their observations as paintings, music, poems and novels. Some of them also collected the folklore. At the same time it was the beginning of the industrial use of wood. She explained that after this the students begin the brainstorming and setting the learning objectives and that they continue the day in the National Park discussing the local developments and investigating the forest statistics, the changing presence of forest in culture etc.

Stop and Reflect

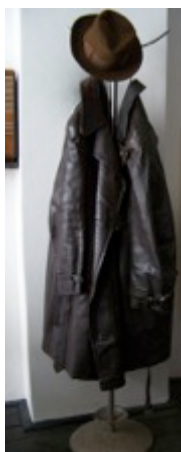


- What are your ideas about which identity issues are key to your student groups and why?
- How will you design new problems to maximise the Identity dimension of problems in your context?

Conclusion

Problems can be very useful as a hook to hang knowledge on and a way of learning knowledge in context. However thinking of *the problem as a provoker of a liminal space* with three dimensions of knowledge, professional action and identity maximises the potential of learning from problems more. It is a concept that can inspire us to design problems focusing on one, two or three dimensions and the interconnections between these dimensions. It makes me think that a web that weaves many strands together is a more effective metaphor for problem design than a hook to hang knowledge on. The web is touched by the sunlight and we hope that students will gain memorable insights from working on the problems we have designed.

Figure 2.24 Problem design metaphors:



A hook to hang knowledge on or a web to weave personal knowledge of concepts, professional actions and identities ?

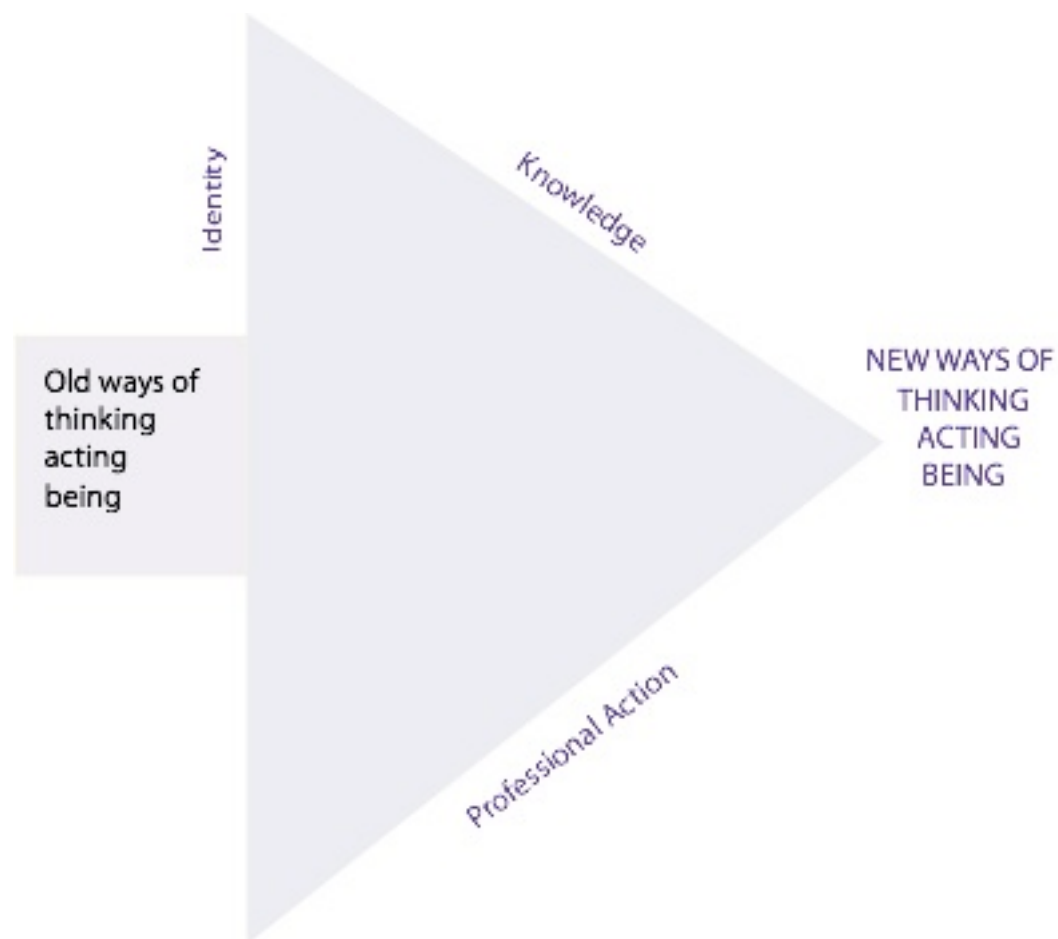


Vogna (2012)

Verihel (2005)




A well-designed set of PBL problems can provoke liminal spaces between 1) current levels of knowing and new levels of knowing, 2) habitual forms of professional action and forms of professional action new to the learner and 3) satisfaction with current identities and a desire to explore other possible identities. The illuminative concept of *the problem as a provoker of a liminal space* is a three dimensional concept.

Figure 2.25 The Problem as a Provoker of a Liminal Space: A Three Dimensional Concept, Terry Barrett



This chapter goes beyond Barnett and Coate's (2005) model of the engaged curriculum by elaborating practical ways in which problem design can lead to new ways of knowing, acting professionally and being. Conceptualising the problem as a provoker as a liminal space has led to practical suggestions for designing problems. And so I summarise the eighteneen suggestions for problem design for you to choose from in the following figure.

Figure 2.26 Suggestions for problem design

Dimensions	Suggestions
Knowledge 	<ol style="list-style-type: none"> 1. Design problems around threshold concepts 2. Identify the learning outcomes, key topics and core transferable skills that you wish the problems to address for a given module/unit/programme 3. Design somewhat ill-structured problems 4. Design problems that encourage students to explore the interrelationship of concepts/dimensions/models/theories
Professional action 	<ol style="list-style-type: none"> 5. Design a set of problems with an awareness of the range of problem types 6. Design problems in a range of media 7. Push out the boundaries of what constitutes a “real-life” problem 8. Combine problem-based learning with action learning 9. Involve key stakeholders in designing and reviewing problems together with assessing problem outputs 10. Design interprofessional problems 11. Design problems connected to work placements 12. Design problems with professional ethics element 13. Design problems to enhance empathy and compassionate action 14. Plan the integration of the problems with the other curriculum inputs of the module/unit
Identity 	<ol style="list-style-type: none"> 15. Write students into the problem so that they identify with the problem 16. Design problems about career development and job seeking 17. Include problems about the identity of new disciplines/therapies/ professions or the changing identity of professions 18. Design problems about issues of national or international identity



Further Resources

Here is a list of some resources that you might like to choose from to work with your tutors, students and other stakeholders in designing problems

Sample PBL problems

University of Delaware, Problem-based Learning Clearinghouse

<http://www1.udel.edu/pbl/clearinghouse/problems/>

Threshold concepts

Threshold Concepts: Undergraduate Teaching, Postgraduate Training and Professional Development: A short introduction and bibliography
This website includes an extensive bibliography of both generic and discipline specific resources on threshold concepts compiled by Mick Flanagan

<http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html>

Empathy and Compassionate Action

Centre for Compassion and Altruism research and Education – Stanford University

Research papers, videos, wiki and blog

<http://ccare.stanford.edu>

Empathy and Compassion In Society

Includes video presentations of keynotes from conferences for professionals in education, health and social care

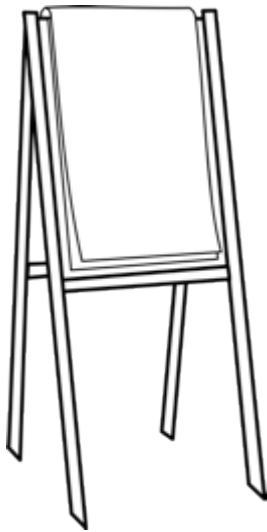
<http://www.compassioninsociety.org>

Concept maps

Novak, J. D. and Cañas, A. J. (2008) *The Theory Underlying Concept Maps and How to Construct and Use Them*. Technical Report. Institute for Human and Machine Cognition, Pensacola

<http://eprint.ihmc.us/5/2/TheoryUnderlyingConceptMaps.pdf>

Action Plan



On your own and with your team think of a specific problem-based learning initiative you are currently designing or re-designing

- How has your thinking about the nature of problems in PBL changed or been enhanced?
- What specific suggestions for problem design do you think would be most appropriate for expanding your students' knowledge, professional action and identity development?
 - What are your ideas for adapting these strategies for your contexts?
 - What additional suggestions would you suggest? Why?
 - What further reading or resource viewing have you been inspired to follow-up?

A PBL Practitioner's Response by Marja-Leena Lahteenmaki



Response to the chapter (and the workshop) by Marja-Leena Lahteenmaki, Principal Lecturer TAMK University of Applied Science, Tampere, Finland

Thank you Terry! You helped us to create problems in new ways using different media. You refreshed our ways of writing more enjoyable and challenging problems as starting points for the learning processes.

We had started to work with threshold concepts already a bit earlier. You gave us encouragement to create more problems focused on them and that way to support students to cross over the liminal spaces. I would also add that it is important to ask students at the end of a module what threshold concepts they have learned and how they have learned them. I do this and find it very useful.

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