H850 Postgraduate Certificate in Teaching and Learning in Higher Education

Pack 4

Design for Learning

Prepared for the Course Team by Jo Tait
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Introduction to this pack

Jo Tait

This brief introduction to Pack 4, Design for Learning, provides an overview and aims to provide a context for your reading. I also suggest some ways to engage with the ideas and activities contained within it and describe the way in which the pack has been written, over a period of time and by a team of authors.

This single pack forms one part of the extensive materials designed, in the first instance, for use by participants in the Postgraduate Certificate in Teaching and Learning in Higher Education programme http://iet.open.ac.uk/coursesonlin. If you have received a full set of these materials as a result of joining the Certificate programme, you will also have access to web-based materials and interactive support from peers and tutors.

Other packs in this series focus on:

- professional capability
- students learning
- assessment and feedback
- teaching methods and approaches.

There are, inevitably, overlaps between the different perspectives addressed by each pack, although we have tried to design each pack so that it can also be read without reference to the others. All the packs contain chapters produced by experienced practitioners and authors that draw on a range of theories and concepts in support of student learning, teaching and assessment practices, higher education and other post-compulsory learning contexts, and professional development. Whether or not you are studying towards a formal qualification, there will be insights and activities with which to engage and to inform and challenge your ideas.

Our readers

There is a broad range of readers who may find this pack useful or rewarding. You might be:

- a lecturer or tutor with a particular professional or disciplinary focus
- relatively experienced or fairly new to your role
- a supervisor in charge of students in work-based practice
- a librarian or IT resources manager with responsibility for supporting students who need to manage information
- a guidance professional with a generic interest in student learning, OR
- in another role that we have not yet imagined.

Working with this pack

Each chapter in this pack begins with a brief overview of its content and approach, often with some contextual detail and advice on how best to use the material. Each chapter provides activities and reflective spaces as prompts to your thinking and as ways to link our 'input' to your context. Although we recognise that not every activity will be appropriate, we do recommend that you jot down your ideas and responses to these prompts.
Whether or not you are participating in a structured learning process, you may be able to pair up with one or more colleagues to discuss the implications of your reading.

Chapter 1 provides a broad sweep of examples of innovatory course designs but Graham Gibbs, the author, says quite clearly in the introduction that he does not aim to persuade you of a ‘best’ approach. Chapter 2, also written by Graham Gibbs, is far more practice-based and guides you through many of the important decisions and procedures you may encounter; you are advised here, to refer to particular case studies as you consider the important questions to ask if you are designing or redesigning a course. In Chapter 3, Ranald Macdonald provides a historical and critical perspective on the still-developing debate about aims, objectives and learning outcomes, while the activities and reflections invite you to compare the theory with your own experience. Chapter 4 extends the earlier chapters by providing an extensive ‘toolkit’ of ways to monitor, evaluate and review courses. Most course and curriculum design is based on what has been before, so such tools are an important resource that ensures that your work in redesigning learning is based on the best available evidence. Chapter 5, by Mary Thorpe, argues that teachers are, in some ways, the ‘experts’ on their own courses, with potentially valuable insights into how their own courses work; she provides theoretical and practical support for the processes of action research and peer inquiry. The final chapter, by Graham Gibbs, acknowledges the increasing importance of resource-based learning; case studies provide examples of different models of course design that rely on resources other than the traditional lecture and seminar series.

Decide, now, what you hope to gain from the pack at this reading and make a note of your questions about course and programme design, if you have any. You may wish to insert pages at appropriate points in this loose-leaf folder to record your questions and notes alongside the appropriate section, or you may wish to collect them together at the back, or use any journal or log that you prefer. Perhaps, in your first browse through the materials, you are hoping for nothing more than an overview of what the file contains. Your pertinent questions may emerge from what you find, but do note them down as even the act of writing may help these vital and personally significant questions stay within your awareness.

You may be looking through this file for quite immediate and tactical purposes. If you are studying towards an assessed course, for example, there will be structures embedded in the assessment process that will influence what you look for and how you work with what you find. For H850 participants, completing an assignment based on a practical course design exercise will use the theoretical and evaluative frameworks outlined in the six chapters of this pack as the bones of some critical reflection on the processes of course design.

The short extracts from seminal theories and research will only come to life when you try them out in your own practice or use them to try and answer your own questions. You will find that the ‘Reflection boxes’ suggest ways in which you might do this, at a range of levels. Do engage with some of these reflective activities: experiment and work with them to challenge and vivify the ideas. Adapt the suggested activities to make them appropriate to your situation. Or, having read the theories that seem to give rise to a suggested activity, feel free to make an informed decision that it really doesn’t apply in your environment.
Continuing construction of the materials

Finally, some understanding of how these materials have been produced may help you decide how you wish to use them. In this pack, as in each of the others, every chapter will have originally been written collaboratively, as is the tradition in the Open University. Even where a single academic has been named as the author, materials are produced through the interaction of groups of experts, known as a Course Team. For this pack, I have re-ordered (and re-edited) materials originally produced by different teams in another format and sequence, so a new level of collaboration has emerged since the materials were first written (in 1998 and 1999).

Minor changes to the content of each chapter in this pack have largely resulted from our re-structuring of the Certificate Programme – our own practical experiment in course design and redesign! In making our amendments to the structure of the Programme and its assessment, we have listened and responded to evaluations and feedback from students, tutors and examiners. And, in the wider environment, we recognise that changes to higher education and the accreditation of teaching in higher education have influenced the needs and expectations of participants. All these factors have affected the pack you now hold in your hands. Its current format allows it to continue to improve in response to feedback and changing needs, so we hope the course will become even more participative, with your engagement and contributions. Please send your comments to http://iet-pgcthe@open.ac.uk.

Jo Tait
Course Team Chair (2002)
Chapter 1  Designing courses: the underpinning theories

Graham Gibbs

Overview

This chapter presents course design as an integrated process involving all aspects of courses and, in that sense, this chapter underpins the whole of Pack 4, forming the introductory chapter and bringing together the other packs that form the core materials for the H850 Certificate Programme.

Course design may involve:
- deciding what the course is for and what it is trying to achieve;
- deciding what the course will contain and in what order you want to teach it;
- deciding how to teach it, and what methods to use;
- identifying, selecting or designing learning resources;
- designing assessment;
- designing student support systems.

This might be described as a teacher-centred view of course design. A student-centred view might also include:
- what students want or need to learn;
- what students already know or can do;
- what differences between students need to be taken into account;
- what students do with their out-of-class learning time;
- how a learning community can be created which engages students in collaborative learning.

Whether taking a teacher or student-centred view, the focus throughout this chapter is on designing course units or modules, rather than designing entire degree programmes.

Texts about course design often describe it as a rational process involving a consistent series of logical stages, usually starting with an analysis of students’ learning needs and the establishment of aims, and finishing with evaluation feeding back into amendments to the course design. This is often described as ‘systematic course design’. Section 1.1 outlines what the process of systematic course design consists of and provides an outline of a course designed in this way. However, few teachers have the opportunity to design courses from scratch in an ideal and wholly systematic way.

Usually a course already exists and is being adapted. Invariably there is a whole range of local constraints and conventions that limit what it is possible to do, and what is acceptable to both students and the head of department. These constraints also determine where thinking about redesign has to start. One of the most obvious constraints is money: we all have to make compromises and manage as best we can within the resources available, for example planning less contact time with individual students than would be desirable. In practice, course design is often about what is possible in the circumstances. However, even in constrained circumstances course redesign can be systematic.
The conventions of course design

Looking back only five or ten years, I would have said that course design in higher education hardly justified the description and, in some institutions, this may still be the case. Across most departments, the courses or modules tended to look pretty similar in terms of their design. They probably all used a similar pattern of lectures, seminars and exams, the same number of topics spread across the same number of weeks, to be tackled by students individually and assessed in three-hour exams, and so on. Such designs were often taken so much for granted that the only decisions to be made were about details of the lecture topics or the exam questions. The possibility that the course aims should be reconsidered, or that lectures or exams might not be the best choices, was usually not even considered.

One fascinating aspect of working across different subject areas as I do is that the 'taken-for-granted' aspects of course design become apparent. For example, why do architectural students – right from the start of the first year – learn about the design of buildings very largely through extended project work undertaken in a design studio, and taught by practising architects? Why are they assessed largely on the basis of the designs they produce? If the answers at first seem obvious, then why is it that construction engineers learn about the design of buildings largely from lectures and short practical demonstrations undertaken in engineering workshops, and taught almost exclusively by academics? Why are they assessed largely by exams? Why do most lecturers consider lecture programmes to be an essential component of undergraduate education when my own institution, the Open University, manages to educate undergraduates without using lectures at all? Why does Oxford University rely almost exclusively on final examinations while Oxford Brookes University, two miles away, derives only 25 per cent of its marks from exams? The answers to such questions lie as much in academic conventions as in anything rational. Courses were (and sometimes still are) designed the way they were because they have always been designed that way in that discipline or in that department or in that institution, or because a 'conventional wisdom' has emerged.

Not only are there differences among institutions but also different countries have quite different assumptions about which methods are 'necessary'. For example, engineering students at the University of Lulea in Sweden spend about half their time in laboratories, while at the Universita Politecnica de Catalunya in Barcelona engineering students hardly experience labs at all. Both departments are probably convinced that their course design is normal and necessary. The Barcelona courses also have a pass rate of about 50 per cent, almost as a matter of principle, while UK courses and their assessment systems are designed to pass at least 90 per cent of students if possible.

I recently worked at the University of Stellenbosch, a research institution in South Africa, where undergraduate students experienced roughly twice the number of classroom sessions a week as does my 16-year-old daughter at school in the UK. Professors at Stellenbosch had deeply felt beliefs about the quantity of teaching that was appropriate for their students, and these beliefs were completely different from those held in most other countries. It seems unlikely that South African students are sufficiently different from students elsewhere in the way they learn to justify such differences.
You may find that your own department has strong beliefs about some of its practices and that it has well-established conventions of course design. Such course-design patterns are seldom based on evidence of effectiveness or even on a coherent rationale. This chapter explores what coherent rationales for course design might look like and gives examples of the use of evidence of effectiveness in making decisions about course design.

But changing the design of your course is not simply a technical matter. Course design takes place in a social and political context where others with a vested interest in the status quo wield power, where administrative rules (for example exam regulations) may override pragmatic concerns for effectiveness, and where new ideas about how to do things are not always welcome. Institutionalised resistance to change can be strong, even where quality and funding agencies require the implementation of an idea or process.

From time to time, traditional patterns of course design have been challenged and even superseded. For example, the traditional pattern of teaching medicine, throughout the world, used to involve several years of parallel lecture-based courses introducing the underlying scientific disciplines, followed by several years of applying this knowledge base in clinical practice. This pattern would have been taken for granted by those who designed courses. However, this pattern of course design has now largely been overturned in favour of problem-based and practice-based interdisciplinary approaches. Knowledge is integrated across disciplines and acquired because it is needed to make decisions such as diagnoses. This change has, in most cases, been accompanied by a dramatic reduction in class contact hours. Today, courses in many medical schools throughout the world – especially those for the first two years – bear little resemblance to those of a decade ago. A course design that was previously ‘taken for granted’ was challenged and then overturned. (Extract 1.1, by Reynolds, builds on this experience in medicine and explores whether a similar problem-based course design is appropriate in psychology.)

The bulk of this chapter consists of accounts in published literature of courses being redesigned in different ways for various reasons. These accounts have been written by the lecturers who implemented the redesigned courses rather than by educationalists. None of the accounts consider all the aspects of course design described in Section 1.1. Each account starts in a different place for different reasons and focuses its attention on particular aspects of the course it is concerned with and ignores others. However, these accounts are still admirably scholarly in that they refer to literature in order to diagnose problems in existing course designs, they select alternatives, explain these alternatives with robust rationales and justify all this on the basis of empirical evidence of improved effectiveness in other contexts.

The accounts, presented as extracts, may seem somewhat daunting in their comprehensiveness and in the scale of change involved. They are written by and for experienced teachers and your experience may, or may not, match their experiences. What we want to suggest is that, taken together, the accounts may provide a model of what is possible: what course redesign can look like when undertaken professionally and in a scholarly way.

The extracts have not been chosen in order to ‘sell’ the particular methods they describe. For example, Extract 1.1 describes the introduction of ‘problem-based learning’ (PBL), but we are not trying to persuade you to
adopt PBL. The intention is to show how a conventional course design was critiqued and an alternative design selected. It is the quality of course review and the thinking involved which we most want to highlight. These examples of redesigns may also illuminate aspects of conventional course design that may need attention in your own courses.

Each extract has been selected to illustrate a different focus of attention in the course design. Extract 1.1 involves a change in educational goals, from acquisition of knowledge to the ability to use knowledge to tackle problems. The problem-based learning (PBL) approach that Reynolds describes involves new teaching and learning methods, new ways to access learning resources and new forms of assessment, but the most important change is in the educational aims the course is designed to achieve. In contrast, Extract 1.2 involves a search for a more effective method of achieving the same educational outcomes, in this case by adopting the personalised system of instruction (PSI). The aims of the course are not changed, but the methods of achieving them are. Both PBL and PSI have been studied extensively and there is a great deal of evidence about the relative effectiveness of courses using these and other kinds of course design. Both PBL and PSI have also been successfully adopted across a range of discipline areas. In Extract 1.3, Pope argues for a unique approach to the distinctive aims of an English course. Here Pope is concerned with new methods – especially assessment methods – for achieving the development of skills, in this case textual skills of a particular kind. The most important feature of the course design Pope describes, however, is its radically different aims.

All three extracts concentrate on important course design components, but none deals with all these components at once.

1.1 A systematic approach to course design

A systematic approach to course design can range from simply being logical and thorough to using systems theory in a formal way. The titles of key texts over the past three decades illustrate the focus and nature of a systematic approach to course design:

- *Handbook of Procedures for the Design of Instruction* (Briggs, 1970);
- *Preparing Instructional Objectives* (Mager, 1975);
- *The Instructional Design Process* (Kemp, 1985);

The key words here are ‘instruction’, ‘objectives’ and ‘procedures’. Course design is portrayed as a systematic procedure for selecting and ordering content for presentation (instruction) and for testing its acquisition. The systematic approach places great emphasis on the identification of objectives, on the design of appropriate and reliable assessment tools, on the selection of appropriate learning resources, and on collecting evaluation data which is fed back into the system to modify course design. Design is described as a logical step-by-step process. Figure 1.1, from Diamond (1998), portrays the course design sequence in two phases. The first phase involves deciding what course to design, the planning of an ‘ideal’ course and then the planning of a version of this ideal which fits the context. The second phase involves detailed specification of each ‘unit’ within the course.
Figure 1.1  Process for the development of educational programmes (Diamond, 1998, p. 17)

Characteristic features of a comprehensive systematic approach include:

- an analysis of needs – including needs of learners or employers – in order to decide what should be taught;
- clear specification of learning objectives (or outcomes);
- clear specification of prerequisite knowledge: what students should already know or be able to do on entry to the course;
- diagnostic tests to ascertain if students have these prerequisites;
- provision of additional learning material or short courses to remedy deficits identified in diagnostic testing;
- breaking up a course into a sequence of carefully ordered shorter units, each with its own objectives and testing;
- careful selection or design of appropriate learning materials to support student learning;
- the careful design of tests or other forms of assessment to measure (only) the achievement of the specified learning outcomes;
the careful choice of teaching methods designed to achieve the specified learning outcomes;

- evaluation to determine whether the course design decisions, especially about assessment, were correct, and whether adjustments need to be made to the design.

Courses are seen as 'systems' and while many may find the language unattractive, this is a powerful concept. The aims, content, teaching and assessment methods are seen as interrelated components of a dynamic system in which modifying one component affects everything else.

Courses designed in a systematic way may be portrayed not as lists of content or teaching sessions but in the form of flow diagrams, with students moving from one box to the next in a planned way as in Figure 1.2.

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**Figure 1.2 A flow diagram representation of a systematically designed course**

In Figure 1.2, students are tested before entry to see if they have the necessary prerequisites. If they do not have them, they are excluded from the course until they have acquired them. If they have the prerequisites, they are directed to Unit 1. But if they come close to meeting the prerequisites, then they are directed to Pre-Unit 01 and/or Pre-Unit 02 to acquire specific knowledge or skills quickly before progressing to Unit 1. Each unit is tested. Every so often there is a diagnostic test to identify those students who need a more solid foundation before progressing; thus,
some students may be routed through Unit 2.1 and/or Unit 2.2 before progressing to Unit 3. The course continues with this kind of structure until a final test measures the achievement of the specified learning outcomes. The core of units may be quite economical, for example involving lectures, while the ‘add-ons’ to meet students’ specific learning needs may use more resources (as with small-group tutorials). The aim is to allocate scarce resources where they will have a maximum impact rather than spread them in an undiscriminating way across all students.

This model of course design may seem suited only to scientific or technical subject matter where outcomes can be tightly specified and readily tested. However, Figure 1.3 below, from Diamond (1998), illustrates this systematic approach being applied to the design of a humanities course – Freshman English – at an American university.

Systematic course design need not involve this degree of specification or even the accompanying language and philosophy. In practice, being systematic need involve only the following components:

- specifying your goals clearly, for example in the form of learning outcomes;
- designing your assessment so that it is clearly focused on measuring the achievement of your goals;
- selecting those teaching and learning methods which are best suited to achieving your goals;
- making sure that the whole ‘package’ of goals, assessment and methods is coherent;
- improving your course through a series of cycles of evaluation and modification (see later chapters in this pack).

All good course design should embody these components to some extent. ‘Soft’ systematic approaches are much more common in practice than the ‘hard’ systematic approaches involving the fixed sequences of action described in Figure 1.1.

**Activity 1.1 Your ideas for and against systematic course design**

Proponents of a systematic approach to course design argue its merits quite forcibly. But clearly there are potential drawbacks as well. For example, it isn’t always possible to identify learners’ ‘needs’ in non-vocational subjects, so where do objectives or learning outcomes come from? As well, breaking courses up into short units isn’t always easy or sensible.

Make a list of the pros and cons of adopting a systematic approach to course design in your own context.

My own analysis of the pros and cons of adopting a systematic approach to designing a course entitled ‘The Psychology of Learning’, which I once taught, produced the following points:
Figure 1.3 Instructional sequence for Freshman English (Diamond, 1998, p. 89)
Chapter 1  Designing courses: the underpinning theories

Pros

- It would have encouraged me to find out more about what my students already knew and what they were interested in.

- It would probably have encouraged those of us teaching this course to get together to discuss our aims more thoroughly and to agree what kinds of student ‘performance’ would have convinced us that these aims had been met. As a result, we might have developed a more consistent approach to assessment. Instead, we concentrated more on designing effective learning processes.

- Students might have been graded differently, as we would have had to define the required standard of learning outcomes more carefully.

- I might have thought more carefully about ‘diagnostic’ assessment and the identification of students who needed additional help or guidance mid-course. We actually collected assessment data as the course went along but we didn’t do anything with it.

- It would have encouraged us to treat the new course design as a ‘first draft’ to be evaluated and modified in the light of feedback (rather than trying to get everything right first time – before we knew how it would work in practice).

Cons

- I already had experience of certain learning activities being very engaging and successful in getting students to think about learning, and this seemed a good start in planning the course. If I’d started my design with aims – as a systematic approach would require – I’m not confident that I would have come up with such interesting teaching and learning methods. Systematic course design may reduce the scope for teachers to use their experience and imagination.

- The assessment methods I used were closely related to the design of the learning activities I had devised. For example, I asked students to interview other students about how they learned, and I tested their ability to interpret transcripts of interviews using the concepts presented in the course. The assessment, and the associated use of classroom time to discuss the interviews students had carried out, encouraged students to take their interviewing seriously and that is where they probably learned most. Focusing on assessment as a measuring device may not create as effective a course as focusing on assessment as a learning device (as discussed in Pack 3).

- I wanted to get students to collaborate and to explain their experiences of learning, good and bad, to each other, and to create coherent sub-groups in which it was safe to have these discussions. A concern for student support or for social issues is often less evident in systematic course design than it should be.

- My experience of developing the design of this course was of a series of lurches and insights, rapid progress and being ‘stuck’ wondering what to do next. Ideas about class sessions, assessment and reading material built up together in a symbiotic way as I thought my way through it. It certainly was not a neat step-by-step process. I find it hard to imagine being able to be creative in a systematic way.
1.2 A problem-based focus to course design

The systematic approach to course design tends to emphasise the sequencing of 'instruction' or even of content. But there are other starting points for course design. In Extract 1.1, a process of course redesign and the thinking underlying it is illustrated; conventional course design in psychology is reviewed and found wanting and a problem-based approach is proposed in its place. This is quite a long extract, but it is clearly written and not overly technical.
EXTRACT 1.1
STUDYING PSYCHOLOGY AT DEGREE LEVEL: WOULD PROBLEM-BASED LEARNING ENHANCE STUDENTS' EXPERIENCES?

Frances Reynolds
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Chapter 1  Designing courses: the underpinning theories
Critiquing current practice

A good starting point for considering course design in your own context is to review the basis of the course designs that already exist. Why are they like that and how well do they work? In Extract 1.1, Reynolds, a psychology lecturer, starts with a critique of conventional course design in psychology, drawing on literature both from within psychology and from other disciplines. She does not start from scratch and argue a case for change as if no one had ever trodden these paths before. Instead, she uses well-established principles and reliable empirical evidence of the effectiveness of the proposed alternative course design. Nor does she restrict herself to the conventions of her discipline or department: she takes and applies a course design developed in an entirely different discipline (medicine).

The starting point for much successful course redesign is the identification of a clear problem that needs to be addressed. Drawing on twelve studies, Reynolds identified a number of potential problems with the way psychology is taught which might well apply to the way other disciplines (such as your own) are taught. In particular, she identified the current emphasis on content and the lack of emphasis on transferable skills. Forty years ago, it might have been possible to teach most of the main fields of psychology within a relatively coherent range of theoretical frameworks. Today, she argues, this is impossible. The knowledge explosion and the incoherent nature of this explosion have made it extremely difficult to justify what content to select for teaching and what theoretical perspectives to leave out. The half-life of psychological explanations and experimental paradigms is alarmingly short. (This problem is not, of course, restricted to psychology.) Concentrating on a knowledge base is also criticised because so few psychology graduates go on to any employment that uses this knowledge base. While most conventional course design involves, primarily, the selection and ordering of content within a specified process, Reynolds questions whether such selection is possible or useful. The lack of development of ‘transferable skills’ which Reynolds identifies is often a direct consequence of the curriculum being over-full of content: there simply isn’t time to develop skills as you race through as much of it as possible. Reynolds also criticises the emphasis on the lecture as the main teaching method:

Lecture programmes reflect a model of knowledge as ‘inert’ (Bereiter and Scardamalia, 1985) and waiting to be transferred from the teacher who owns it to those who do not.

So here the choice of methods involves a critique of the nature of the entire educational process.

Activity 1.2 Reconsidering a course you teach

1. What aspects of Reynolds’ critique of conventional psychology teaching might apply to the design of a course you teach?

2. Do you have other criticisms of the design of this course that might be the starting point for a course redesign?
Among the kinds of ‘course design problems that need fixing’ that I have often found when working with lecturers are these:

- Despite apparently clear explanations in lectures or comprehensive handouts, in exams students seem as if they are encountering some topics for the first time, revealing little evidence of understanding or thought. Students may report being surprised by the difficulty of the exam or by the questions asked.
- Despite demonstrating an apparent ability to tackle problems of the kind presented in class, students seem unable to adapt or apply what they know when confronted with anything unpredictable or more complex.
- Students appear simply not to be putting the hours in out of class, arriving for sessions unprepared and showing little practised familiarity with what is being studied.
- Students seem to go about their studying in a private and solitary way, and learning does not appear to take place socially or collaboratively.

It might be possible to blame the students, but an alternative diagnosis is that some aspects of course design contribute directly to these problems. I might begin to address each of the above problems by:

- giving attention to clarifying the goals and standards of the course and the nature of the ‘performance’ students will be expected to display at the end;
- diversifying the nature of assignments to include some that go well beyond what has been covered in class;
- designing out-of-class learning activities more carefully and using assessment requirements to capture the time necessary to tackle these activities;
- designing group-learning activities or introducing peer tutoring into the course.

These are all components of course redesign. They may be less comprehensive than those described by Reynolds but they are still targeted on specific problems.

Does problem-based learning work?

Before adopting such a radical approach to course design as PBL, it would be wise to check whether it was any better at tackling the problems identified in the conventional approaches, or whether new problems were thrown up. Basically, I would want to know if, all things being equal, I could expect PBL to make my course work better. What kinds of questions would you want answered about PBL? You might ask whether students:

- had, or could quickly develop, the learning skills to be able to tackle such apparently difficult learning tasks successfully;
- covered the same amount of ground in the same time as they would have done with conventional course designs (especially as the British Psychological Society has professional requirements about what is ‘covered’);
- understood and could apply their knowledge more successfully;
- worked harder and found the whole process more engaging.
You might also ask whether it took a lot more of the teacher’s time to run a course like this.

**Activity 1.3 Your questions about PBL**

1. Write down your own questions about the relative effectiveness of PBL.
2. Then go back to the section headed ‘Is PBL an effective method of learning?’ in Extract 1.1 and see whether Reynolds cites evidence that answers your questions. Her final section, entitled ‘Common challenges of PBL’, also contains evidence that may address your questions.
3. Where Reynolds does not answer your questions, where could you go to find out more?

Try the following website, which is for those interested in PBL: http://www.samford.edu.pbl/

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**The central idea of PBL**

Starting with questions, as in the activity above, and then finding learning resources to help pursue these questions, is a key learning process within PBL.

The principal idea behind PBL is that the starting point for learning should be a problem, a query or a puzzle that the learner wishes to solve.

(Boud, 1985, cited in Reynolds, 1997)

The implications of such an apparently simple underlying rationale for course design are profound. We normally assume that the starting point for learning is disciplinary knowledge, but everyday problems seldom line up neatly within disciplinary boundaries and such boundaries are much less marked within PBL curricula. Content has to ‘earn its keep’ – to be found to be useful in tackling problems – if it is to be included. We normally assume that you have to know something before you can apply it. In PBL the application and the acquisition happen together and do so repeatedly at successively increasing levels of sophistication. PBL assumes that problems are inherently engaging while knowledge is often inherently dull, and so tackles problems of student motivation in an entirely unexpected way. PBL recognises the importance of a need to learn – a need often missing in conventional course design – and generates this need by designing problems that students are unable to tackle without acquiring specific additional knowledge and skills that they have themselves identified as necessary.

**Reflection 1.1 What’s different about PBL?**

Returning once more to Extract 1.1, what other conventional practices does Reynolds say are handled differently in PBL?

The differences I would pick out are these:

- The weekly pattern of teaching and learning is different. PBL usually involves successive cycles of identifying the nature of the problem and what needs to be learned, independent learning, a return to the
problem and a review of what has been learned. This multi-stage process usually spans three or more weeks. This is quite different from much conventional teaching, which has a weekly cycle.

- Students learn collaboratively. Almost all PBL is undertaken in groups, both in and out of class. (In fact, PBL is quite difficult to undertake on an individual basis.)

- The role of the teacher is different; it involves such processes as helping to analyse a problem and identify what needs to be learned, making access to learning resources easier, and generally providing support during a sometimes perplexing process. In some early implementations of PBL, tutors who were not experts in the topics involved were deliberately chosen to lead problem-based seminars, to prevent them from adopting a conventional knowledge-centred approach to teaching. Nowadays PBL tutors tend to be trained to adopt this problem-focused role, so that they can use their subject expertise without disempowering students.

- The main sources of subject knowledge are outside of class and do not emphasise teachers as sources. Knowledge may be found in libraries or in specially prepared learning resources collected together around each problem. Knowledge may also be shared by other students who have independently studied other aspects of the problem and brought this learning back to the group.

Adaptations and hybrids

When innovating, teachers seldom simply copy someone else’s course design in all its details. Instead, they adapt it to their own needs, taking ideas and methods which seem fruitful and leaving out features which look like being more trouble than they are worth or which are simply impractical. Reynolds, too, adapted PBL to local conditions.

You may have noticed the way Reynolds adapted the use of lectures in the example of the ‘Life Stages’ course, associating them with a particular case. In PBL courses, lectures are sometimes retained in a disguised form, under such euphemistic titles as ‘fixed learning resources’. Lectures can clearly be useful and economical sources of relevant knowledge which students may draw on in tackling problems, rather than themselves spending time locating and collating material and developing a focused diagnosis of the problem. The danger might be that students come to rely passively on being provided with all the relevant knowledge, rather than actively seeking out information. If the lecturer is going to give you all the answers anyway, why bother? Lectures carry with them implicit messages about what learning consists of which contradict the implicit messages in PBL, so too much use of lectures might compromise the impact of PBL. Reynolds acknowledges this in the final section of the extract.

To conclude, Reynolds has:

- identified a course-design problem that needed tackling;
- identified a potential course-design alternative;
- reviewed the rationale of that alternative to see if it addressed her problem;
- reviewed evidence about the effectiveness of that alternative;
- adapted the alternative to her context;
• considered a number of questions about the likely effectiveness of the alternative, some of which can be answered from published evidence and some of which will need to be explored by evaluating her own course.

This looks like a model of professionalism in course redesign.

1.3 A student-learning focus to course design

Most of the formal documentation used for course approval concentrates on what the teacher does in order to teach, rather than on what the student does in order to learn. Lecture and seminar titles may be listed but what students are supposed to do out of class is less clear. However, most students spend anywhere between half and four-fifths of their learning time out of class – or at least they are supposed to. In many cases, you will find that students do not put in a full learning week. This may be because they do not know what they are supposed to be doing, or because there are no consequences of not studying out of class: they can progress to the next week and the next topic whether or not they have learned anything about the last topic. Concentrating on designing only the teaching may not be a successful strategy for producing learning.

PSI: a personalized system of instruction

Extract 1.2 describes the use of a radical alternative to the teacher-centred perspective on course design. It was developed by a North American, F. Keller, when he found himself confronted with huge classes and inadequate teaching resources at a new university in Brasilia and was simply unable to continue with a conventional course design. His seminal paper, ‘Goodbye teacher’ (Keller, 1968), outlined an approach to supporting student learning which is now known as the ‘Keller Plan’ or personalized system of instruction (PSI). It has the following characteristics:

• The course material is divided up into short units of about one week’s student work, each defined in terms of ‘behavioural objectives’ (see Chapter 2 of the Reader) which specify what students should be able to do (rather than ‘know’) by the end of the unit.

• Students are required to demonstrate ‘mastery’ of the material – that is to show that they can indeed do all they are supposed to be able to do – before they are allowed to progress to the next unit; pass marks may be set at 90 per cent rather than the 40 per cent common in most courses; short tests are constructed which are designed to reveal whether or not students have achieved the specified objectives.

• Students progress at their own pace; they offer themselves for a test on each unit when they feel ready and the fastest students are able to complete the entire course well before the end of the planned period.

• If they pass the test, they are given the objectives for the next unit.

• If they fail the test, they are given immediate remedial tuition and invited to submit themselves for an alternative version of the test at a later date, perhaps a week later.

• The tests are marked immediately, and the remedial tuition is provided on the spot by ‘proctors’ – students who have succeeded on the course in the past – or by graduate students.
• Students study independently from textbooks or other specially prepared materials rather than being taught.

• Lectures are used for motivation rather than as key sources of information, sometimes after each unit has been completed, as an overview.

• No final examination is normally considered necessary as students will already have demonstrated mastery of the entire course by the time they complete the last unit.

This course design therefore emphasises students studying independently for well-defined tests, and places very little emphasis on teaching. Two teaching roles – the assessment and remedial tuition – are undertaken by fellow students. The crucial feature is the design of well-defined units and their associated tests which can be sat then marked quickly and easily. This clearly makes PSI more appropriate for some subject matter than for others. Most applications have been in science, maths and technology, although applications in the social sciences and other subjects are also possible.

There is a substantial literature comparing PSI courses to conventionally taught alternatives in a variety of disciplines, institutions and academic levels. PSI has fairly consistently been found to be more effective at achieving the same objectives, using the same tests, than lecture-based programmes. Students also rate PSI more highly than conventional alternatives (for reviews of studies see Kulik et al., 1979; Kulik and Kulik, 1989). Whether PSI is cheaper than conventional alternatives depends on whether students or more expensive teachers undertake the assessment and remedial tuition, but it is not clear that using teachers for these roles actually improves the effectiveness of PSI. PSI is commonly used for introductory material where there are large classes and so it is not the sophistication or maturity of students which makes PSI work.

The research findings about the use of PSI highlight a number of important aspects of course design:

• Teachers are not always necessary: in the right circumstances students can learn perfectly successfully on their own.

• Students can learn equally well from texts as from lectures; the Open University relies heavily on this.

• Designing courses clearly, so that students can see what they have to learn, can be important.

• Providing regular tests or other feedback on progress can be important.

• Progressing in a series of small steps through a course may be much more effective than covering a large amount of material before being assessed.

• Some course designs are fairly consistently more effective than others.

While some educational methods go in and out of fashion, PSI has continued to find applications, boosted recently by the potential for using communication and information technology (C&IT) to support the independent learning involved, instead of using only textbooks. Extract 1.2, by Rae, describes the application of a version of PSI to a mathematics course at Brunel University over an eight-year period. While Keller’s original rationale for PSI was firmly rooted in behaviourist psychology, subsequent implementation has been more pragmatic, basing detailed
design decisions on evidence of effectiveness rather than on theoretical concerns. Sherman (1976) inferred from various studies that, 'the features of PSI should not be discarded without reason' (p. 37), but insisted that nothing about PSI was sacrosanct: 'It should not become the new orthodoxy or be slavishly followed' (p. 39). This sensible advice applies to use of almost all course designs that can be found in the literature. Rae made a number of changes to Keller’s original version of PSI for a range of pragmatic reasons.
EXTRACT 1.2
SELF-PACED LEARNING WITH VIDEO FOR UNDERGRADUATES:
A MULTI-MEDIA KELLER PLAN

Andrew Rae
Reflection 1.2 Adapting PSI - what works?

Think about the main adaptations that Rae made to PSI and why? Is it possible to tell if they were effective?

Three changes that Rae made highlight important characteristics of PSI. First, there is a potential problem with procrastination. It is possible that students will simply not get on with studying and taking tests and, left to their own devices, will get further and further behind until time runs out, and they fail. Some versions of PSI abandon self-pacing. Rae's solution was to use mid-course and end-of-course exams as well as tests associated with each unit of study. Second, despite evidence of the effectiveness of the use of student 'proctors', many academics are sceptical. Rae used graduate teaching assistants and group tutorials and taught much of the course himself. Third, Rae made extensive use of video and computers with on-screen feedback providing solutions to the mathematics problems students had tackled.

Given the extent of changes to the original PSI model, it would not be possible to tell whether these changes were, on their own, responsible for any measurable success. It could have been the use of C&IT, the regular tests or any number of other features that were crucial. With most innovation in course design, many different things change at the same time and you do not have tight control over all these variables. All that you can tell is that the package as a whole works. And it often works as a package so that if you take a particular element out, the whole thing may stop working so well; not because that element was in itself crucial, but because the package no longer holds together. For example, the group tutorials Rae describes might work because all the students had experienced the same computer feedback on problems; with this feedback element removed, the tutorials might not work.

Rae reports strikingly good overall student performance, with students averaging 70 per cent or 'A' grades even in large classes, and a failure rate of less than 3 per cent. This is very unusual for a 'service' mathematics course with a wide range of mathematical backgrounds amongst the students. The self-pacing of PSI suits heterogeneous groups particularly well and the facility to 're-run' videotapes of short sections of explanation also suits heterogeneous groups well, compared with fixed-pace lectures. A subsequent study by Hambleton et al. (1998) compared the performance of students taking this PSI course with their performance on conventional courses that they were taking in parallel. They found that students took a deep approach to a greater extent on the PSI course, that is, they attempted to make sense of the material rather than just memorising it. This is an interesting finding in that one might expect PSI courses to focus students' attention narrowly on the demands of the tests, but this is not what happened. Rae achieved better performance and better quality of learning.
Activity 1.4 Redesigning your course with PSI

Map out, in note form, a redesign of a course you teach, using as many features of PSI as possible. Try drafting out a complete PSI version of your current course, if that is feasible. Otherwise, try building into your design individual features of PSI such as self-pacing, the use of regular tests, the use of textbooks or other learning resources, the use of proctors, or the use of teaching only as a summary or motivating element. Be creative in adapting the underlying ideas to your context.

Then look at your redesign and ask yourself:

1. Would it work? What would be most likely to work well?
2. What might work least well? What could you change to address that potential problem?
3. What would your students think about it and how would they react?
4. If you ran the course, what questions would you want an evaluation to address?

Responding only to the last question in Activity 1.4, the kinds of questions I would want to ask when evaluating a PSI course would be:

- Do students actually learn more, or does the changed nature of the tests disguise the real learning outcomes?
- Do students understand how they are supposed to be going about their studying and how the course works?
- Do they get the remedial tuition they need at the point of testing, or do they need additional explanations and teaching?
- Are the learning resources adequate?
- Do students need, or would they welcome, a more social and less individualised and solitary approach to learning?
- Are there gross variations in student progression and performance – wider than on a conventional course – or is the ‘tail’ of weaker performance shorter?
- Do the best students get stretched, so that they perform as well (or better) than they would have done on a conventional course?
- Does it save teaching time, and is any saving balanced against increased use of resources of other kinds?

As a final comment on Extract 1.2, it is noticeable how much Rae appears to know about the way PSI courses are taught elsewhere – he refers to Elton’s course (at the University of Surrey), Harding’s at Southampton and a course at Massey University in New Zealand. His references are not only to the literature but to other institutions. A great deal can be learned about course design by finding out how others teach courses similar to your own, and why. Contacting friends at other institutions and asking them to send you relevant course outlines can be very worthwhile! It also seems likely that if Elton and Harding had not written up and published their teaching experiences, Rae might not have found out about their courses. And if Rae had not written up his experience, we would not be able to
learn from it. Writing up and publishing what you learn is as important to
the scholarship of teaching as it is to the scholarship of discovery research.

1.4 Course design to develop skills

The aims of an individual course are often influenced or even determined
by its context, and in particular by the aims of the programme of study of
which it forms a part. One of the most pressing influences in recent years
on the design of programmes has been the requirement to develop in
students 'transferable skills', in addition to discipline knowledge and skills.
Teachers are being expected to specify these skills in terms of 'learning
outcomes', and to assess the achievement of these outcomes in some way.
In fact, one of the most common reasons for redesigning courses has been
to build an explicit concern for skills development into courses in which it
was absent or at least not explicit. This has involved reconsideration of the
aims of courses, the way these courses are described, their teaching and
learning methods, and their assessment. Extract 1.3 outlines the way an
English department has responded to this challenge and is followed by the
documentation for an introductory English module which illustrates this
approach, set in the context of the aims of the English programme as a
whole.

Rob Pope, who wrote this extract, is also the author of an introductory text
for students, The English Studies Field Handbook (Pope, 1998). This text
explains the skills, concepts and techniques that are used by experienced
analysts of texts such as English lecturers, and demonstrates these
techniques with a huge range of examples. It is a wonderful
demonstration of making the skills of a discipline explicit. The design of
the English module described in the extract does a similar job, modelling
the skills involved and giving students practice at using these skills.

At some level, Extracts 1.1, 1.2 and 1.3 are all concerned with developing
in students the ability to tackle problems: problematic scenarios in
psychology, maths problems and the challenges posed by texts. However,
the course designs through which students are taught to tackle these
problems are completely different.
EXTRACT 1.3
A VERY 'ENGLISH' PROFILE? A MODEL FOR SUBJECT-BASED DEVELOPMENT, AND AN ARGUMENT FOR PECULIAR PRACTICES IN PROFILING

Rob Pope
Reflection 1.3

Pope’s English course (Extract 1.3) has many interesting features. List the three that you see as most significant, and make notes about why these features matter.

The three features I find interesting are these:

- even the lectures are interactive and involve ‘bouts of practical work, demonstrations and exercises’;
- there are detailed notes on weekly reading and preparation, involving the practice of specific skills outside of class;
- the exam requires students to use the analytical skills the course is trying to develop, rather than relying on memory.

In fact the whole course is about doing as much as about knowing.

How does the list of educational aims specified for Pope’s ‘Language, literature, discourse I’ module stand up to the standards proposed in the guidance provided by the Quality Assurance Agency in their benchmarking statements for English?

Does it matter how these aims are presented? Pope, in his statement of overall aims, uses phrases such as ‘enhanced awareness’ and ‘sources of pleasure and resources of power’. Is there a place for such language in the specification of aims? And are these aims assessed appropriately by the assessment methods used in the module?

David Baume, a member of the original course team for H850, offers some critical comments from a background that is clearly not an Arts or Humanities discipline.

I found the five ‘subject-area aims’ that Rob Pope describes for English Studies to be engaging and attractive, though not quite as clear as they might be. I felt that they contain a sometimes awkward mix of aims and learning outcomes, and the extent to which they are assessable also varies.

I had similarly mixed reactions to the four educational aims in the description of the ‘Language, literature, discourse I’ module, and to the module’s overall aim: ‘the improvement of students’ analytical and expressive capacities, and an enhanced awareness of language as a source of power and of pleasure’. However, I believe that most of the problems could be solved without losing the many virtues of these goals. For example, subject-area aim 1 is a clear overall learning outcome. It contains two ‘effectivelys’ and one ‘appropriate’, each of which would provide valuable prompts for lively discussion during the course.

These discussions could help to clarify the outcomes further, and therefore make them a more explicit basis for assessment.
Unpacking ‘many kinds’, ‘high degree’, ‘technical precision’ and many of the other terms in the second subject-area aim, which is also a learning outcome, would bring similar benefits.

The overall aim of the module is delightful, and surely wholly appropriate for this course. I would want to see students doing this, and being able to talk and write clearly about when and how they have done it. However, before making a judgement about the assessability of the module, I would want to see not only the learning outcomes, but the assessment tasks and the assessment criteria. They are strongly implied in the module description, and they are certainly mostly or fully in Rob’s head. But I would not be entirely comfortable with that: they are not sufficiently accessible there, in Rob’s head, to students and to assessors other than Rob. They just need more writing down, with clarity as well as ‘pleasure and power’.

1.5 Course design to create student involvement

An implicit assumption in many course designs is that students learn on their own, often in private and silently, in parallel with other students doing much the same thing. The potential benefits of students learning collaboratively and talking with each other outside of class are exploited surprisingly seldom. In some contexts, any such collaboration may even be seen as cheating. In other contexts, teachers know that when they set problems, students do help each other tackle them, but this is tolerated rather than actively encouraged. By contrast, Extract 1.1 involved a deliberate attempt to engineer collaborative learning by using PBL, and the course described in Extract 1.3 goes on to offer the following advice to students:

- It will help you to acquire knowledge, weigh materials, formulate questions and engage in activities for yourself – but not on your own. Where possible, talk with colleagues ...
- embrace any possibility to share problems and possibilities.

Creating a ‘learning community’ that fosters motivation to learn and shares learning resources – both material and human – can be a central feature of the effectiveness of courses. Collaboration can have dramatic impacts on student learning at little or no cost. It can also take a variety of forms.

- A second-year engineering course at the University of Strathclyde used peer assessment regularly; students marked each other’s work and gave immediate written feedback to the author of the work. Students paid more attention to the quality of their own work and learned from seeing and marking others’ work. This almost doubled the average marks on the course with no other changes made, and at no cost in teachers’ time (see Forbes and Spence, 1991).
• An accountancy course at London Guildhall University formed students into learning teams of four and told them that although they would sit the exam as individuals, they would be given the average mark of their group of four. The result, of course, was that they taught each other to make sure that no-one dragged down the mark. There was a considerable increase in average students’ marks and a dramatic reduction in failures. What is more, the students who gained the most were the strongest students: the act of teaching the others improved their learning and increased their marks even more (see Cooper, 1994). Again this improvement was at no cost to the teachers concerned.

• A Graphic Information Design course at Falmouth College of Art and Design put considerable effort into building socially coherent student groups who supported each other’s individual design project work. This was partly to provide additional peer tuition and to develop more independence, but also to overcome a problem caused by lack of social coherence in the past. The traditional ‘crit’ used in design, in which a whole class publicly views and criticises an individual’s final designs, had been found to be overcritical, inducing defensiveness rather than open-minded consideration of the comments which were made. Paying attention to the social dynamics of student groups helped to create a more supportive and less threatening learning community (see Davies, 1992).

• In a course that involved using a computerised design package, new students’ background experience with computers and software packages varied considerably. Instead of introducing additional remedial teaching the teachers introduced peer tutoring. The more experienced students helped the others learn how to use the computer package; 89 per cent of students found the peer tutoring to be at least as effective as tutoring by lecturers (Magin and Churches, 1995). A description and evaluation of this course can be found in Chapter 4 of this Pack.

Reflection 1.4 Peer support and assessment in your course and for your learning

What aspects of the design of a course or programme with which you are involved could be improved by the use of peer assessment or peer tutoring in some form?

In the course for which this chapter was originally written, the following uses of peer tutoring are possible.

• Course participants (students) may submit answers to some activities to their tutor group electronically, using FirstClass computer conferencing software. They can also elicit comments from other participants and see how others responded to the activities and comment on their answers.

• Participants can pose course-design problems they face, such as how to cope with a wide variety of students or how to assess a complex skill economically, and ask other participants to suggest solutions.
Participants are invited to obtain feedback from other participants to their assignments. This may be as valuable as feedback from the tutor, since all participants are engaged in learning and teaching in a higher education context.

This section has not been about peer assessment or peer tutoring but about trying to build a socially supportive environment in which learning is more likely to take place. The social characteristics of a course, and the extent of student involvement, can always be left to chance, but can also be designed, just as assessment can be designed.

1.6 Conclusion

It would take an enormous number of extracts similar to those in this chapter even to begin to illustrate the full range of course designs used in higher education. These extracts give just a glimpse of what is possible. I hope they also illuminate the way experienced teachers go about the business of redesigning their courses and the ways in which they explain this process to themselves. It isn’t always neat and tidy, but it can clearly be engrossing and rewarding: the passion of these teachers shines through their accounts.

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**Text**


Figures