

DESIGNING SUBJECTS FOR LEARNING: PRACTICAL RESEARCH-BASED PRINCIPLES AND GUIDELINES

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Keywords

subject, backward design, constructive alignment, course, curriculum design, intended learning outcomes, learning-centred, unit

Introduction

The purpose of this chapter is to help academics to promote deeper, more meaningful, longer lasting student learning – without increasing their workloads – through better subject design. Its underlying premise is that many subjects are less effective at promoting learning and less efficient to teach than they could and should be. This occurs because subjects are typically *constructed* based on unexamined, often implicit practices rather than *designed* according to explicit principles or criteria. To promote good subject design, this chapter outlines a process that is both principled and practical. This learning-centred design process combines ‘backward design’ (Wiggins & McTighe 1998) and ‘constructive alignment’ (Biggs & Tang 2007) and is supported by theory and research.

There are many excellent sources of ‘how-to’ advice – how to lecture, how to organise group work, how to assess, how to use technology – readily available online and in print (see Davis 2009 or Svinicki & McKeachie 2011, for example). Useful resources on the specifics of subject and course development also exist (Fink 2003; Grunert O’Brien et al. 2008). This chapter focuses, instead, on helping university teachers pose and answer the first-order or ‘meta’ design questions that should precede choices of specific subject content, techniques or technologies. It would, after all, make little sense for a builder to select construction materials and

tools before knowing, in some detail, the design requirements of the structure planned. Similarly, it makes little sense for teachers to select specific content, teaching techniques or technologies without understanding, in some detail, the design requirements of the subject to be developed. This is, therefore, a chapter on how to make good subject design decisions.

This chapter will be useful to readers with a range of needs, priorities and interests. For example, if you are facing a looming deadline to design or redesign a subject, you may find it helpful to skip directly to the design questions and the text immediately following each. Similarly, if you find that some questions posed in this chapter have already been answered for you or are not relevant to your circumstances, you may choose to focus only on those to which your answers will matter most.

What are the core elements of a subject?

The terms ‘subject’, ‘unit’ and ‘course’ are used in different institutions – and sometimes even within the same institution – to denote a variety of curricular elements. In this chapter, a subject is defined as one element of many that constitute a larger degree program of study. Typically, students enrolled in degree programs must successfully complete a minimum number of discrete subjects in order to earn the desired qualification. Thus, full-time students in bachelor-level programs may be enrolled in four subjects each semester or term over three or four years. In this chapter when we discuss subjects, we are talking about, for example, Psychology 101 or Organic Chemistry 2A.

The great majority of subjects – whether taught face-to-face, fully online or in blended mode – have the following seven elements in common:

- *learning outcomes* (or goals or objectives) – the stated educational aims of the subject
- *teaching activities* – the specific types of work that teachers do to promote student learning; for example, lecturing, demonstrating, questioning and leading discussions (see Chapter 2, Hunt et al. 2012)
- *learning activities* – the specific types of work students are assigned by the teacher in order to learn, individually or in groups, in a classroom or outside it, in personal study or online; for example, reading, working problem sets, doing laboratory assignments and discussing assigned questions or problems
- *learning resources* – the time, staffing, workspaces, resources, tools and technologies made available to achieve the explicit aims of the subject; for example, timetabling, teachers, tutors, learning support staff, classrooms, laboratories, studios, libraries, learning management systems, websites, textbooks, readings and a host of more specialised resources depending on the discipline

- *feedback activities* – the types of work teachers do to provide learners with the information and guidance required to improve their current learning performance. Also known as formative assessment (Ambrose et al. 2010; Angelo & Cross 1993), feedback activities are typically employed before the summative assessment tasks and grading
- *assessment tasks* – the specific types of work teachers design and students carry out to demonstrate the quality and quantity of their learning in order to gain formative feedback or summative grades (see Chapter 5, Brown & Race 2012); for example, the learning activities listed above may be assessed for formative or summative purposes, and other common assessments include quizzes, tests, examinations, portfolios and performances
- *grading standards* (see Chapter 14, Krause 2012) – the explicit criteria and levels of performance used for evaluating and labelling the quality of student learning demonstrated through summative assessment tasks.

These seven core elements are minimum requirements in virtually every subject guide or syllabus. Therefore, it is not the elements, per se, but rather their organisation and sequencing, expression, relative emphasis and degree of alignment that differentiate effective from ineffective subject design. The design choices we make overall, and in relation to each of these seven elements, can raise or lower the odds that students will learn deeply and well. By analogy, we might note that while all houses are made up of the same basic structural elements – foundations, walls, roofs, windows, doors and so on – some houses, by design, are more elegant, practical and even sustainable than others.

It is of course possible for teachers to construct functional subjects without following explicit educational designs, just as it is for skilled builders to construct functional houses without architectural drawings. But, while it is increasingly uncommon, and often illegal, in modern urban societies for new houses to be built without plans, it is still very common for higher education curricula to be built on tacit assumptions.

In every state and locality, zoning ordinances and construction standards constrain housing design choices to a greater or lesser degree. Available materials, site characteristics and budgets impose further constraints. Skilled architects are well aware of those constraints and find ways to achieve their clients' and their own intended design outcomes with minimal compromise. Skilled teachers do much the same. In most universities, academic policies, procedures and guidelines – and the available resources – set the context and practical limits within which subject design choices can be made. For that reason, it is critical to become familiar with relevant policies, procedures, guidelines and teaching and learning resources before making specific decisions about your subject design.

YOUR THOUGHTS

Looking at your institution's curriculum and subject design policies, note the extent to which they include the seven core elements listed above.

- What other subject elements, if any, does your institution require?
- Do policies and guidelines make reference to any relevant educational research?

Why invest time and effort in subject design?

On one level, a subject is simply a sequence of activities organised to promote learning – an educational process. Like any other process, a subject may be well designed or poorly designed to achieve its aims. In poorly designed subjects, even highly skilled and experienced teachers and well-prepared, hard-working students struggle to succeed. Time, attention and effort that could have been spent on teaching and learning are wasted in clarifying unnecessary confusions, improvising solutions to inherent problems, recuperating from avoidable breakdowns and failures and, in the worst cases, dealing with students' complaints and grievances. For less-skilled and less-experienced teachers and less-prepared students, struggling to cope with poorly designed subjects can be demoralising and sometimes devastating.

Students' time is finite and valuable, so subjects should be designed to help them learn deeply, efficiently and effectively. In addition, a well-designed subject should be cost-effective and sustainable in terms of the amount and level of staff time it requires, since staffing typically accounts for 70 to 80 per cent of a subject's total educational costs. If a subject's costs exceed its revenues, then it will have to be subsidised by other more efficient subjects. While such cross-subsidisation is common and sometimes justifiable, particularly in the case of compulsory core subjects, it is difficult to sustain. Consequently, investing even a modest amount of time initially to design subjects well can advance effectiveness, efficiency, equity and sustainability in the long-term.

What is constructive alignment?

The 'constructive' in 'constructive alignment' refers to constructivist theory, which posits that students must actively construct rather than passively receive learning if it is to be meaningful and lasting. 'Alignment' refers to the explicit linkage of teaching and learning activities and assessment tasks to promote achievement of the intended learning outcomes. The premise is that a well-aligned curriculum can help students to construct their own learning more effectively and independently (see Biggs & Tang 2007, pp. 52–54).

While the focus of this chapter is mainly on within-subject alignment, most subjects are also elements of larger curricula. In a well-designed curriculum, individual subjects are well-aligned horizontally, complementing and reinforcing other subjects taught in the same year of a program with minimum unintended redundancy. They are also well-aligned vertically, with explicit and effective connections ‘downward’ to prior subjects or prior educational experiences and ‘upward’ to subsequent subjects. Horizontal and vertical alignment, however partial, can provide more educational coherence and efficiency for students and staff alike.

Why design backwards?

Notwithstanding the name, ‘backward design’ has a very straightforward logic. In essence, backward design requires that we begin by making clear what we hope to have achieved at the end. Virtually all contemporary buildings, products, campaigns and complex processes are designed backward from intended outcomes. For example, architects, often working with engineers and others, define exactly what a finished building should look like and how it should function before any dirt is dug or nails hammered.

As applied to the curriculum, ‘backward design’ is backward in two different senses. First, it starts with the end, not the beginning. The backward design process starts by defining what students must demonstrate they know and can do (intended learning outcomes) and how well they know and can do it (standards) by the end of the subject or degree program, and then works backward to determine how best to get there and where to start. In other words, only after the intended learning outcomes and standards are set does one decide what topics to teach and what teaching, assessment and feedback methods to use. Second, it is ‘backward’ in relation to common practice. Many, if not most, teachers still construct subjects by starting with the preferred topics, texts or teaching methods without explicit reference to intended outcomes or standards (see Wiggins & McTighe 1998, pp. 7–9).

Why take a learning-centred approach?

A dichotomy is often drawn between teacher-centred and student-centred approaches to education. There is, however, a third way: a *learning-centred* approach to curriculum and subject design. The learning-centred approach focuses on three key elements of the curriculum: what is to be learned (the intended learning outcomes); how well (the grading standards); and how to determine whether learning outcomes are achieved at the appropriate standard

(the assessment tasks). In this approach, the quality of learning outcomes achieved is the desired end, and all other aspects of the curriculum design are means. Taking a learning-centred approach compels us to make design decisions, first and foremost, on the basis of what will most effectively and efficiently promote the intended learning outcomes, rather than on which teaching strategies and technologies staff and students might find most interesting and trendy or least demanding.

That said, staff and student perceptions and interests matter, as do those of other groups. In constructing subjects, it is common practice to attempt to balance the perceived or expressed interests and needs of the:

- teacher(s)
- discipline or field (see Chapter 3, Land 2012)
- stakeholders
- institution
- students.

Many subjects strongly reflect the particular research or scholarly interests, preferences and passions of those who teach them. Most subjects are also strongly influenced by the views of disciplinary leaders and associations about which topics and skills matter most. In professional fields, in particular, external stakeholders, such as accrediting bodies or employers, can significantly and directly influence the content of the curriculum. Each educational institution, and each faculty or college in turn, strives to put its own distinctive stamp on the curriculum. And the needs and interests of students can significantly influence enrolments and, thereby, the life or death of subjects and programs.

How to balance competing interests

These five different ‘interest groups’ exert competing and sometimes conflicting pressures on curriculum decisions. At any given moment, the pressures from stakeholders may outweigh those from the discipline, or the teacher’s personal preferences may trump the students’ interests. All of these interests are legitimate and worthy of consideration. Balancing these competing interests is a key curriculum design challenge, particularly in deciding what to include (and what to leave out) and how to teach. To make such decisions in a coherent, consistent manner, we need some overriding principles, or decision rules.

To help academics make those difficult curriculum design choices, the following three decision rules are proposed:

- put deep learning first
- take a scholarly approach
- design for your successors.

Put deep learning first

Deep learning is defined as learning that lasts and can be recalled and used effectively after the subject or course has been completed. To test if your subject requires students to demonstrate deep learning, you might apply the following ‘parrot test’.

Suppose scientists had developed genetically modified African Gray Parrots which could not only learn, understand, remember and use the core vocabulary of your discipline, but could also type, using parrot voice-recognition software. Given their prodigious powers of rote memorisation and ‘playback’, could one of these parrots enrol in and somehow amass enough points to pass your subject? More realistically, is there any way that a student could pass your subject simply through rote memorisation – or by plagiarising or cheating – and without demonstrating deep learning? If the answer is yes, then the subject fails the parrot test and is probably not well designed to promote deep learning. If, on the other hand, there is no way students can pass your subject without demonstrating an appropriate depth of learning, then your subject passes the parrot test: bad news for parrots, but good news for you, your subject and your students.

Take a scholarly approach

The hallmark of higher education is its commitment to research and scholarship (see Chapter 8, Jenkins & Healey 2012; Chapter 15, Trigwell 2012). Turning that scholarly focus inward, on our educational programs, would require that we ask: What research-based, empirical evidence is there to support the way we design curriculum, teach, assess or give feedback? In some disciplines, a great deal of empirical research has been published on teaching and learning questions. (Disciplines such as economics, engineering, physics, nursing and psychology have been extensively studied.) To investigate research on teaching and learning in your discipline, apply the ‘Google Scholar™ test’.

Set aside one hour to search the scholarly literature for research on effective teaching and learning in your discipline or field using an appropriate web search engine. If you have specific teaching and learning approaches in mind, such as group work or formative feedback, you can also search for research literature on those topics. Even better, convince a librarian, a postgraduate student or advanced undergraduate to collaborate on this web search with you. In most cases, after even one hour of focused searching, you are likely to know whether there is research to support your choices regarding content, approaches and techniques, research indicating better options, or no relevant research.

Design for your successors

In order to confirm that your subject is well designed, apply the ‘bus test’. Suppose that the individual who developed a particular subject is hit by a bus – or a tram,

or falls ill, goes on leave, takes another position or retires. If that individual's subject is well designed and clearly documented, other teaching staff with relevant disciplinary expertise can quickly and effectively prepare and carry on the teaching and assessing. By contrast, it is very difficult to take over teaching of someone else's poorly designed subject, or one in which the design is not explicit. Consider whether your colleagues would be able to take over teaching your subject with ease, if they had to do so. If not, why not? A well-designed subject is not person-dependent and, as a consequence, can pass the bus test.

Research-based guidelines for deep learning

There are authoritative summaries of research on teaching and learning on which to base good curriculum design and teaching practice. Three of the most often cited and used are *How College Affects Students* (Pascarella & Terenzini 2005), *How People Learn* (Bransford et al. 2000) and *Visible Learning* (Hattie 2009). Based on my own reading of these summaries, and many other sources, I have developed a set of seven research-based guidelines for designing and teaching, which are offered below.

Overall, research suggests that virtually all students can learn more – and more deeply – when our curriculum designs and teaching practices help them to:

- become explicitly aware of their own relevant prior knowledge, preconceptions, misconceptions, beliefs and values – and to *unlearn*, as needed (see Chapter 3, Land 2012)
- set and maintain realistically high and personally meaningful learning goals and expectations for academic success
- learn how to study and learn effectively, so that they become increasingly self-directed, self-regulating independent learners
- understand the criteria, standards and methods used in assessing and evaluating their learning and how to make good use of feedback on their performance against those standards
- collaborate regularly and effectively with other learners and with teachers to achieve meaningful, shared learning goals
- invest adequate time and effort, effectively and efficiently, in their academic work
- seek and find connections to and applications of the concepts and skills they are learning to their lives and work (see Chapter 10, Garnett 2012).

YOUR THOUGHTS

- Which of the guidelines proposed above seem potentially most useful to your own teaching and subject design?
- What guidelines does your institution or your professional or disciplinary association provide for good practice in teaching and curriculum design?

Designing subjects for learning: 10 specific questions

The sequence of the questions below is absolutely intentional. In applying backward design to create or revise an academic subject, it is essential to begin with the overall purpose and context of the subject before setting the standards, related assessment tasks and specific content.

To assist in this process, consider the following 10 questions:

1. What is the overall purpose of this subject?
2. Where does this subject fit?
3. For whom is this subject designed?
4. What specifically should students learn and be able to do by this subject's end?
5. What standards will be used to assess their learning?
6. How will their learning be assessed?
7. What specific content will be taught and assessed?
8. What will motivate students to learn deeply and well?
9. What work will students do to learn?
10. What work will teachers and others do to help students learn?

What is the overall purpose of this subject?

If you had to sum it up in a few words, would the primary purpose of your subject be to promote:

- discipline-specific knowledge and skills?
- general graduate attributes or capabilities?
- work or career-related knowledge and skills?
- basic academic language or learning skills?
- personal awareness, development or growth?
- something else? (If so, what else?)

While most subjects are meant to serve multiple purposes, it is helpful to know which is foremost among them as you make the inevitably difficult decisions about what to emphasise, what to cut and what to keep. Understanding the purpose of your subject will influence the rest of the subject design process.

Where does this subject fit?

In most cases, a given subject has a place in the sequence, and a function in the larger context, of one or more degree programs. In a well-designed program, a given subject will function primarily as a *cornerstone*, *core*, *capstone*, *depth* or *breadth* learning experience.

Cornerstone subjects function as portals or bridges into the academic program. They are meant to ensure that students can demonstrate sufficient 'starting line'

levels of competence in the key learning outcomes – the specific knowledge, skills and values required to succeed in the program.

Core subjects further develop and deepen students' competency in relation to those key program learning outcomes.

Capstone subjects are usually culminating experiences, designed to help students reflect on, integrate and apply what they have learned throughout the program. Capstones also often serve as portals or bridges out of the program into postgraduate studies or employment (Holdsworth et al. 2009).

While cornerstone, core and capstone subjects are all typically required or compulsory subjects, depth and breadth subjects are often electives. Depth subjects typically focus on one skill, as in writing- or research-intensive subjects, or one topic in the discipline. Breadth subjects, on the other hand, are meant to help students see the 'big picture' and are often, therefore, interdisciplinary in nature.

YOUR THOUGHTS

- Where does your subject fit in the sequence of the degree program – beginning, middle or end?
- What is its main function in the program: cornerstone, core, capstone, depth, breadth or other?

For whom is this subject designed?

When an academic is asked what he or she teaches, the response is typically the name of a discipline or field, such as physics, physiotherapy, philosophy, economics or early childhood education. Rarely do teachers reply that they teach students. Yet all experienced teachers know that the complex characteristics of each cohort of students have significant influences on how, how much and how well we teach and students learn. Among the most powerful factors in students' achievement is their prior learning, or lack of learning, in relation to the subjects they attempt.

If one is teaching introductory statistics, for example, it is useful to know in advance students' prior mathematics coursework and achievement test scores. If a large proportion of a cohort is relatively underprepared, then it would be wise to design-in more learning support. This additional support might be provided through tutorials, labs, workshops, the institution's learning support unit or through online resources. Conversely, if most of the incoming students are well prepared, designing-in a higher level of challenge would be reasonable. Quite often, introductory subjects have students whose preparation levels and language skills are diverse. Designing the subject to respond to diversity in students (see Chapter 11, Broughan & Hunt 2012) can lessen stress on teachers and improve outcomes for learners.

Institutions can normally provide teachers with useful information on the prior preparation and other relevant characteristics of the students in their subjects and courses. Department or school heads and administrators are good first contacts in seeking such background data. If data on incoming students is not available, then the overall profile of current students may prove the best predictor. And, if there is no data available in advance, one can always collect relevant information from the students via an informal survey at the start of semester.

YOUR THOUGHTS

- What kind(s) of students is your subject designed to serve?
- What kind(s) of students are actually enrolled in your subject?
- What useful data on your students' learning-related characteristics is provided to you by your institution or faculty?

What specifically should students learn and be able to do by this subject's end?

Backward design begins and ends with clearly written intended learning outcomes (ILOs), concise statements of what students are expected to demonstrate that they know and are able to do by the end of a subject or degree program. They are 'intended' in two senses. First, they represent an intentional approach to curriculum design by specifying the expected learning outcomes – what should be achieved – in advance. They are also 'intended' in contrast to what may or may not actually be the 'observed' student learning outcomes by the end of the subject or course. ILOs represent a commitment to be evaluated against a predetermined goal. There will be gaps between the intended (pre-subject) and observed (post-subject) outcomes. The smaller and less consequential those gaps, overall, the more effective the subject design.

The questions below provide a simple framework that may help in drafting and revising ILOs. To demonstrate the process, Case 6.1 takes the ILO 'Students will understand the causes of World War II' from a second-year history subject and revises it using the framework below.

CASE 6.1 REDRAFTING AN INTENDED LEARNING OUTCOME (ILO)

First-draft ILO

Students will understand the causes of World War II.

Who?

Each student

Will do what?

Identify what he or she believes to be the three most powerful factors leading to World War II in Europe or the Pacific, and explain and analyse the choice

For what audience?	Students in a first-year history class
When?	Between weeks six and eight
Where?	Online
How?	Through a five-minute maximum podcast recording
How well? (to what standard?)	At the 'meets expectations' level or above on the grading rubric as assessed by the tutor and by the majority of the first-year students who review the podcast
Why?	In order to demonstrate in-depth understanding of the readings, critical thinking and oral presentation skills

Revised ILO

Between weeks six and eight, each student will explain his/her identification and analysis of the three most powerful factors leading to World War II in Europe or the Pacific to students in a first-year history class through a five-minute (maximum) podcast, in order to demonstrate in-depth understanding of the readings, critical thinking and oral presentation skills.

Standard: The quality of the podcast must be assessed at the 'meets expectations' level or above, overall, by the tutor and the majority of the high school students who review it.

YOUR THOUGHTS

In relation to any subject you teach:

- To what degree are the ILOs in your subject vertically and constructively aligned with those of other subjects in the program?
- To what extent are the subject ILOs learning-centred?
- Could you improve an existing ILO or draft a new one using the question framework illustrated above?

What standards will be used

In addition to clarifying *what* students should know and be able to do, the subject design must specify *how well* students must know and do it. Standards indicate the quality of performance expected and help to set learner expectations. The power of high expectations to motivate better performance has long been documented in education research. The challenges arise both in setting appropriately high expectations and in communicating them in ways that lead to understanding, acceptance and, ideally, internalisation by the learners.

Standards that are developed and owned by professions, disciplines, faculties, programs or even small groups of teachers are likely to be more valid and persuasive than those developed by one individual. It is, therefore, useful to

investigate whether there are existing achievement standards that are appropriate to your subject, or which could be easily adapted. Professional accrediting bodies, disciplinary societies and even government agencies can be sources. The Australian Learning and Teaching Council (ALTC), for example, sponsored projects that engaged academic staff in developing learning standards in a range of disciplines (ALTC 2011). Other potentially useful information and examples of standards can be found in relation to the Association of American Colleges and Universities Valid Assessment of Learning in Undergraduate Education (VALUE) Project (Association of American Colleges and Universities 2012); the European Union's project on Tuning Educational Structures (University of Deusto n.d.); and the UK's higher education Quality Assurance Agency (2011).

If you cannot find relevant or adaptable external standards that are appropriate for your subject, it may be worth contacting other academics, within or outside your institution, who teach the same or similar subjects and examining the standards they have set. Subject outlines or syllabi containing this information can often be found on the web. In the end, benchmarking your standards is likely to lead to clearer expression.

YOUR THOUGHTS

- How have the standards for student learning in your subject been developed? Against what other standards, if any, have they been benchmarked?
- Whom might you ask to review and critique your draft standards?

How will students' learning be assessed?

In a backward-designed, constructively aligned subject, all assessment tasks must be clearly connected to the intended learning outcomes, grading standards and learning activities. In practice, this means that assessment time and grading weight should be allocated to parallel the relative importance of subject ILOs. For example, if the development of critical thinking is more important than memorising facts and principles, then assessment tasks must clearly focus on and reward the former. All too often, subjects seem to assess not what is most important, but rather what is easiest to assess.

At the end of the last century, Gibbs (1999, p. 153) identified the following six functions of assessment in higher education:

1. capturing student attention and effort
2. generating appropriate learning activity
3. providing feedback to students
4. developing within students the ability to monitor their own learning and standards

5. allocating marks to distinguish between students or to distinguish degree classifications
6. ensuring accountability to demonstrate to outsiders that standards are satisfactory.

Gibbs noted that only the first four functions are relevant to promoting learning. He summed up his expert advice – based on a long career spent in academic development, research and policymaking in relation to teaching and learning improvement – in the following short paragraph:

We need to use course requirements, portfolios, self and peer assessment and a range of other devices which are strong on functions (1)–(4) but which do not need to address functions (5) and (6) at all. If I was allowed a single message to improve student learning it would be to manipulate the assessment system so that functions (1)–(4) were performed as often as possible. Evidence from diary studies suggests that students are almost exclusively oriented to the assessment system, spending as little as 10 per cent of their time by year three on work which is not assessed (Innis 1996). If we want to change student learning that is where we have leverage. Being preoccupied by function (6) will not impact student learning in helpful ways.

(Gibbs 1999, p. 154)

In essence, learning-centred assessment tasks are those which: motivate students to do the kinds of work required to learn deeply and well; provide useful and timely feedback required to further improve their learning; and help students to develop skill in monitoring and regulating their own learning. If assessment tasks are designed, first and foremost, to promote deep learning – for formative purposes – it is a fairly straightforward task to then apply subject standards to students' work for grading purposes – summative assessment.

In designing assessment for deep learning, a key question is: How can students effectively, authentically and efficiently demonstrate that they have achieved the intended learning outcomes at the appropriate standard? Once the ILOs and standard of performance have been set, there are many available resources that can help teachers choose assessment tasks that strike a good balance between authenticity and efficiency (see Chapter 5, Brown & Race 2012).

What specific content will be taught and learned?

Only now do we come to selecting the content. Backward design delays content selection until this point in the subject design process not because it is unimportant, but precisely because making the right decisions about content is critically important in promoting learning. While the ILOs and standards come first, and

should generally focus on high-level concepts and skills, in order for students to learn and demonstrate that they can think critically and creatively, and can write and speak well, they must think critically and creatively, and write or speak *about* something. That something is the content.

A key premise of backward design is that the specific subject content is, nonetheless, a means to greater ends. In nearly every discipline and field, the amount of important information grows exponentially over time, whereas the key concepts and skills are much smaller, more slowly changing sets. Once one has considered the purpose, fit, audience, ILOs, standards and assessment for a subject, selecting the appropriate content to interest, motivate and assist specific types of students to achieve a given standard of performance is a much more focused, intentional task than simply deciding ‘what to include’. In this task, once again, professional and disciplinary societies – as well as textbooks and web resources – can provide guidance and examples.

YOUR THOUGHTS

- If you were to revise one of your subjects through backward design, how would you begin?
- To what extent would backward design revision lead to the selection of different content and assessment?

What will motivate students to learn deeply and well?

Motivation is a much-theorised and researched topic in psychology and education (see Chapter 1, Stewart 2012; Svinicki 2004). Svinicki provides a succinct synthesis of the relevant literature that addresses practical issues of subject design and teaching in higher education. Her seven strategies for enhancing student motivation are as follows:

1. Be a good role model of appropriate motivation.
2. Choose learning tasks with utility, challenge and interest value.
3. Encourage accurate self-efficacy about the course.
4. Base evaluation on progress or absolute level achieved to produce mastery goal orientation.
5. Encourage attributing success to effort and interpreting mistakes as learning opportunities.
6. Provide choice and control over goals or strategies to the learner.
7. Communicate high expectations that are in line with student capabilities (Svinicki 2004, p. 167).

Designing even two or three of these strategies into a subject can increase students’ motivation to take on and persevere in the challenging work of learning.

YOUR THOUGHTS

- How might you design some elements of choice into a new or existing subject?
- How might you design or redesign your assessment and feedback practices to encourage students to take risks, make mistakes and learn from those mistakes?

What work will students do to learn?

In order for students to learn deeply and well, in ways that lead to independence and further learning, they must engage in ‘deliberative practice’, that is, ‘practice focused on improving particular aspects of the target performance, to better understand how to monitor, self-regulate and evaluate their performance, and reduce errors’ (Hattie 2009, p. 30). Most of the deliberative practice students require to learn deeply must be done outside of class meeting time and without direct supervision from the teaching staff. Therefore, a key challenge in subject design is to create learning activities that will help students spend their study time productively. The most productive learning activities provide ‘cognitive scaffolding’, step-by-step guidance that promotes both the achievement of the ILOs and, at the same time, the development of transferable metacognitive skills, such as self-regulation.

CASE 6.2 SESSION PREPARATION ASSIGNMENTS

Session preparation assignments (SPAs) are specific and detailed written instructions provided to help students prepare for subsequent class meetings thoroughly, effectively and efficiently. Many teachers complain that the majority of their students do not prepare sufficiently – or at all – for their lectures, tutorials or laboratory sessions. To address this lack, session preparation assignments tell students not only *what* they are expected to prepare, but also *why*, *how*, *how much* and by *when*. Each session preparation assignment contains the following basic elements:

- a list of the intended learning outcomes (ILOs) to be addressed by the assigned work (the why)
 - a list of ILO-related key questions, problems or prompts to be answered or addressed in writing (the what) before the next meeting (the when)
 - a list of the assigned readings and problem sets to be used in responding to the questions (the how much)
 - explicit tips on how to read and prepare for the next class meeting (the how)
 - information on where and how to get help and support, if required.
 - Session preparation assignments are used as the basis for in-class or online discussions and are marked very quickly and simply – often on a 0 to 3 scale (not submitted = 0, requirements not met = 1, requirements met = 2, requirements exceeded = 3) – contributing a very small number of points to a student’s overall subject grade.
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YOUR THOUGHTS

- Identify some examples of learning activities in subjects you teach that provide ‘cognitive scaffolding’ (structured guidance for student learning)
- How does your subject communicate expectations about the type and amount of learning work students are expected to do?
- How would you design a session preparation assignment for one of your classes?

What work will teachers and others do to help students learn?

According to Hattie, ‘The aim is to get students to learn the skills of teaching themselves – to self-regulate their learning’ (2009, p. 245).

At this point in the 21st century, we know quite a bit about how to promote deep, lasting learning. Summaries of the best empirical research indicate a number of teaching and learning strategies that work (Hattie 2009; Pascarella & Terenzini 2005). Among the most powerful teaching strategies are the following:

- providing timely, useful feedback – the primary educational justification for assessment tasks
- providing direct instruction on specific areas of confusion – typically to follow up feedback
- reciprocal teaching – that is, teaching students to teach each other
- teaching students metacognitive, self-regulatory strategies – strategies for managing and improving their own learning.

If there is time enough only to focus on one of these four powerful strategies, then feedback would be likely to provide the greatest learning returns on investment. Nicol and Macfarlane-Dick (2007, p. 205) offer useful research-based principles for facilitating self-regulation and effective learning through feedback. They suggest that good feedback practice:

- helps clarify what good performance is (specifying goals, criteria, expected standards)
- facilitates the development of self assessment (reflection) in learning
- delivers high-quality information to students about their learning
- encourages teacher and peer dialogue around learning
- encourages positive motivational beliefs and self-esteem
- provides opportunities to close the gap between current and desired performance
- provides information to teachers that can be used to help shape teaching.

The list above can serve as useful checklist for both feedback design and practice. Following such good practice guidelines is only possible if one focuses feedback on a very few critical assignments or assessment tasks; preferably tasks that students will be encouraged or required to resubmit, applying the feedback in order to learn and to improve their performance on summative assessment. Feedback is most effective when it is valued and consequential.

In conclusion: The seven Cs of successful curriculum design

Simply put, a well-designed learning-centred curriculum is one that helps all willing and able students achieve and demonstrate the expected standard of learning more effectively, efficiently and successfully than they could on their own. A short list of criteria for designing curriculum is proposed below, using alliteration to aid recall. Given that a single subject is usually one element in a larger curriculum – and typically makes up a rather small proportion of the whole program – it would be unrealistic to expect any single subject to meet all seven criteria fully. That said, in order for the parts (subjects) to align with and contribute to the whole (program of study), each element of the curriculum should be designed with the overall criteria in mind. To that end, subject-level design questions follow each criterion. Once you have drafted your subject design, you might give the draft a second look in light of the following criteria.

A well-designed curriculum is:

- **compelling.** To what extent does the subject focus on questions, issues or topics that interest and matter to students, staff and other stakeholders? In what ways will completing it successfully make any difference to students? A year after finishing the subject, how likely is it that students will look back on it as a meaningful and useful experience?
- **conceptual.** To what extent is the subject focused on ‘learning that will last’ rather than ‘learning that will quickly pass’? To what extent do the subject’s learning activities, assessment tasks and feedback activities focus on understanding and mastery of key concepts and skills – the conceptual level – and to what extent on the memorisation of facts and information?
- **constructively aligned.** How well aligned is the subject internally? How clearly are learning activities and assessments connected to the intended learning outcomes? And how well is it aligned externally with the rest of the curriculum, both horizontally – with other subjects at the same level or year – and vertically – with the subjects and experiences that come before and after?
- **challenging.** How well do the subject design, assessments and grading standards communicate high expectations to learners? Is the subject sufficiently

intellectually challenging to engage and benefit the best-prepared and most-able students? Is it sufficiently intellectually challenging to engage and benefit the teaching staff?

- consistent. To what extent is the design consistent with larger institutional values? For example, if the institution claims to value inclusiveness, equity and diversity, how well does the design provide all students with adequate scaffolding, support, feedback and access to learning support? Do all students who are allowed to enrol and who are willing to devote sufficient time and effort have a fair and reasonable opportunity to learn and succeed? Will all prospective students clearly see that this subject is offering them a 'fair go'?
- connected. To what extent does it help students make appropriate, useful connections to their course of study, to their current or future careers, to their roles as citizens? How well does the subject promote transfer and application of learning?
- cost effective. Is the subject financially sustainable in terms of its total cost per student enrolled? And is it sustainable in terms of the time and effort required of teaching staff and students? In terms of money, time and effort required, will the return on investment be sufficient for students and staff?

If your subject meets most of the criteria above then it is almost certainly well designed both for learning and for teaching.