

# Transforming Higher Education: Reconceptualising the Instructional Design Model for the Knowledge Society

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## Abstract

Higher education in the new millennium faces several major challenges. Along with an increased demand for a tertiary educated workforce, both the state and the student are demanding that the cost of this education be minimised. We are also faced with a demand for flexible learning from an increasingly mature age, part-time and off-campus student population.

Elsewhere (Somasundaram, Bowser & Danaher, 2006), the authors have proposed three concepts as pivotal to achieving a society of lifelong learners: learning relationships; systematic learning; and learning resources and tools. Here we elaborate our conceptualisation and possible applications of systematic learning in promoting the concerns and interests of the contemporary knowledge society.

Applying the principles of systems thinking (Gharajedaghi, 1999; Senge, 1990), the authors synthesise a process model of systematic learning taken from instructional design (e.g., Dick, Carey & Carey, 2005; Shambaugh & Magliaro, 2006). The synthesis adds two important elements not included in most theoretical instructional design models: accreditation and maintenance. An economic analysis of the synthesised model illuminates the constraints on transforming our higher education system caused by the scarcity of particular resources. A comparative case study of two methods of learning and achieving accreditation in accountancy simultaneously tests and illustrates the model.

The authors contend that these resources need not be scarce and suggest how these bottlenecks can be disbanded. The paper elaborates on the solutions proposed by this analysis, which suggests answers to some of the challenges facing the transformation of higher education and the global knowledge society in the 21st century.

Keywords: Instructional Design, Knowledge Society, Systematic Learning, Systems Thinking

## Introduction

Higher education in the new millennium faces major challenges. As we move into the age of the knowledge society, Trow (2005) sees higher education "opening up even further to become systems of universal access" (p. 6). As higher education becomes a mass commodity, there is a greater market-based approach, a fee for service expectation from students and governments that are demanding proof that their contributions are being used as effectively as possible. Parallel to this are changes in student demographics. No longer are undergraduate students traditional school leavers moving straight from school. Another paper at this conference describes an Australian regional university where 60% of its undergraduate students are not traditional school leavers (Somasundaram, Bowser & Danaher, in press). Change is

also demanded of pedagogies. Many universities now actively promote flexible delivery, and a few run fully web-based degrees.

Applying the principles of systems thinking (Gharajedaghi, 1999; Senge, 1990), the authors have developed a model of learning environments that proposes three sub-systems that are critical for the creation of a learning (or knowledge) society (Somasundaram, Bowser & Danaher, 2006). That paper briefly explores these three sub-systems (Figure 1) to illuminate the constraints on the free dissemination of knowledge.

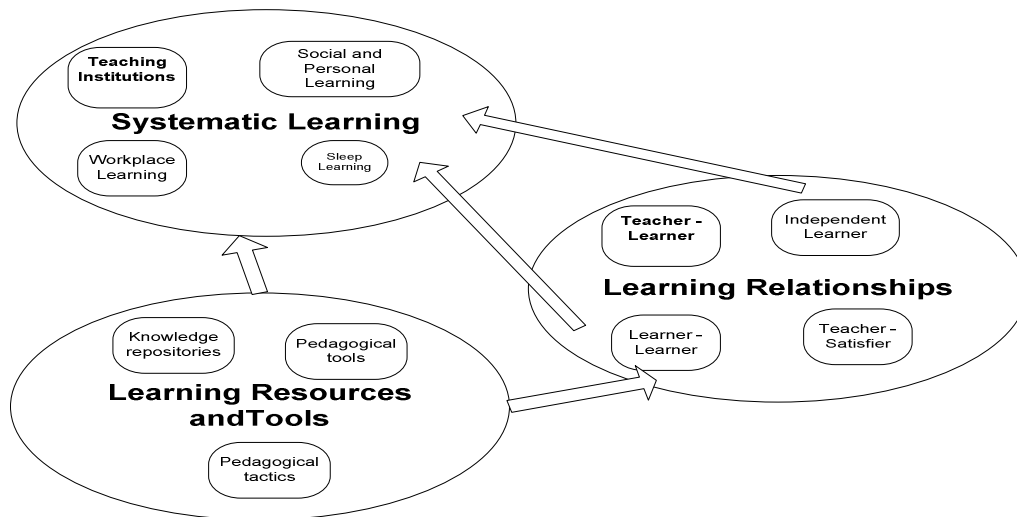


Figure 1: Three Sub-systems of a Knowledge Society (Somasundaram, Bowser & Danaher, 2006, p. 295)

The first sub-system is that of learning relationships. We live in a market, barter-based economy. The authors propose that the dominant learning relationship of our time is that of the Teacher-Learner. There are at least three other possible relationships, those of the Learner-Learner, the Teacher-Satisfier and the Independent Learner. They are less costly to operate, but are shunned as they do not generate the wealth that the first one does.

A second sub-system is the Learning Resources and Tools used to generate learning. The constraint here is intellectual property legislation. The drive to exploit such sources of income has several significant indirect costs that do not provide incentives to inventors and creators and that hamper the development and utilisation of the resources needed by a learning society.

The third sub-system is that of systematic learning, the organised process for gaining large amounts of learning. The paper identifies two principal constraints with this sub-system. Firstly, a process model of systematic learning is developed from instructional design theory (e.g., Dick, Carey & Carey, 2005; Shambaugh & Magliaro, 2006). An economic analysis of the fixed and variable costs associated with the different stages of the systematic learning process illuminates where the costs are. Secondly, the processes for systematic learning are principally focused on and designed for taking place within teaching institutions, even though time within formal teaching institutions forms only a small part of a person's life.

This paper expands and evolves the ideas presented in the other paper about the third sub-system. We use a comparative case study approach (Merriam, 1998) to compare and contrast two systematic methods of obtaining qualifications in accountancy as a means of testing and illuminating the application of our model of systematic learning.

It is appropriate to complete this introduction with a paragraph from the original paper's conclusion:

Our purpose is not to offer clear solutions. Nor do we feel that precise global solutions can be proposed to transform...[ourselves into a knowledge society]. We do not even claim that the analysis that we present...is right. What we do claim is that it is a legitimate perception of our situation, and that it provides useful insights [for transforming ourselves into a knowledge society]. (Somasundaram, Bowser & Danaher, 2006, p. 295)

# Systematic Learning

There are many models for instructional design, and we use two published models to derive a model suitable for economic analysis. Dick, Carey and Carey (2005) propose a seven stage model (pp. 6-8) (plus a three stage process for revision and continuous improvement). Shambaugh and Magliaro (2006) propose a four stage model (p. 165). We combine elements of both these approaches to propose four common stages as most enlightening for our subsequent economic analysis: (a) the establishment of learning objectives or outcomes; (b) the design of delivery; (c) delivery (including formative assessment); and (d) summative assessment. Figure 2 provides a mapping between the two published models and ours.

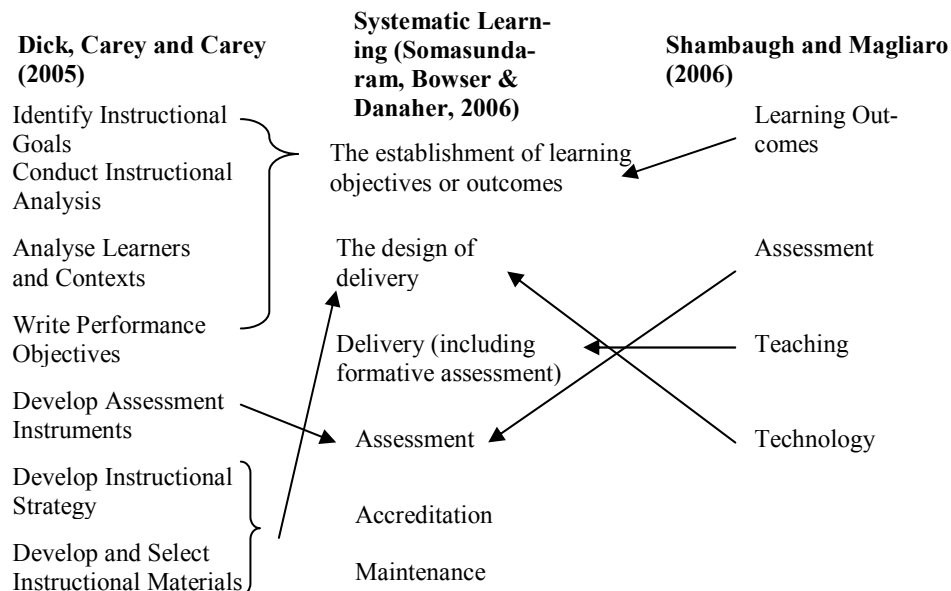


Figure 2: Comparison of Instructional Design Models

In practice, the establishment of learning objectives and outcomes is expressed in a syllabus, curriculum statement or program outline. The design of delivery consists of developing lesson plans and coursework materials. Alternatively, teachers can rely on textbooks, many of which come with a teacher's guide, assessments and websites that may provide further reading, currency, interaction and dialogue. Delivery consists of actual teaching, tutorials and laboratory sessions. Summative assessment is the formal process used to confirm that the student has met the learning objectives or outcomes.

To these four stages we add two more which, while not important where learning is for self-actualisation, are critical in a knowledge economy. The first is accreditation, the process of getting one's learning recognised by those who matter. University diplomas are no longer sufficient in many professions; the university's program needs to be accredited by an appropriately recognised body. Accreditation typically moves from local to nationally consistent standards, and usually adds a practical flavour to the skill set certified by a university degree. Accreditation is often controlled (though not necessarily managed) by the state, with laws that require certain activities, such as authorising prescription drugs or certifying building plans to be done only by appropriately accredited persons. Accreditation may be examination-based, such as by a piece of summative assessment conducted by the assessing body, process-based, where there is reliance on the applicant going through a process, or a combination of the two.

The second additional stage is that of maintenance. A knowledge economy is not simply satisfied with an assurance that a person had a set of competencies at a particular time. A knowledge economy requires that its professionals maintain their competence (and we use the term to include knowledge, skills, habits and ethical behaviour) and that they practise their profession within ethical guidelines and to accepted standards.

## Economic and Pedagogical Analysis

A useful technique in economic analysis is the identification of fixed and variable costs. A fixed cost does not vary with the number of goods produced. For a factory, for example, an initial expenditure is required to obtain the land and buildings, but their costs remain fixed (as long as one operates within capacity). Raw materials, on the other hand, are variable costs, varying directly with the number of goods manufactured.

The design of learning outcomes and objectives is a fixed cost, and is independent of the number of students taught. So is the design of delivery, though arguably one would need to design new pedagogies if student numbers move from small to medium to large classes. These costs are incurred relatively infrequently, once every few years.

Assessment has both a fixed and a variable cost, with the development of the assessment tool being a fixed cost and the physical holding of exams and marking being a variable cost. Multiple choice questions, and latterly computer-based assessment, tend to reduce the costs of marking.

Delivery, on the other hand, tends to be largely a variable cost. While adding one or two students to a class makes little difference, significant changes require differently sized classrooms and more tutors and labs. As delivery expands to be performed by more people, the infrastructure required to maintain consistency increases.

Accreditation is in many ways a replication of the first and third stages: the establishment of learning outcomes and an assessment that the competence necessary for those learning outcomes has been attained. It therefore is largely a fixed cost, but with an element of variable costs in the assessment. Accreditation may also require a period in the workplace (such as an internship), which may serve both as a learning experience and as an assessment of whether applicants can and do apply their competencies routinely in the workplace.

Maintenance typically has three outcomes. One is standards setting, establishing the standards a profession works to. The second is continuing professional development, requiring members not only to maintain their competencies but also to stay current with new best practices. The third is maintaining competent behaviour. Standards setting is a fixed cost. Continuing professional development should be a smaller version of the first four stages, but is usually quite poorly developed, and not at all reliable. Registered members typically need to attend a prescribed number of hours of learning, with no requirement for completeness or assessment. It has both fixed and variable costs.

Maintaining competent behaviour is often passive, simply handling public complaints, but may occasionally be active, such as auditing the monies lawyers hold in trust. These costs are largely variable.

## Model Weaknesses

Models are by nature simplifications. They are useful to the extent that they hide complexities that are irrelevant to the purpose of the model and dangerous to the extent that they hide relevant complexities.

The model of systematic learning presented here is very much a teleological and analytical perspective. The model ignores the “encouragement of ambition, and the creation of personal ties and links” (p. 13) that Trow (2005) ascribes as a function of elite higher education institutions. It assumes that learning can, and implies that it must, be systematised. It implies that learning by osmosis and diffusion is at best inefficient and perhaps even non-existent. It implies that learning, unless it can be measured and assessed, does not exist. In truth, our ability to measure competency is quite limited.

The boundaries of the model are somewhat porous. Assessments are themselves learning tools. It is sometimes difficult to draw a clear line between outcome definition and design.

Our model of systematic learning ignores the role of academic motivation (Pajares & Schunk, 2005). Systematic institutional plans to retain students (Tinto, 2005), though not always directly related to achieving competencies, are necessary functions of a higher education institution.

However, our purpose is not to debate the pedagogical merits of this model – though we argue that such debate is necessary. The model of systematic learning with the requirements of a syllabus, lesson plans and assessment is by far the dominant contemporary model of teaching. Our purpose is to clarify the higher learning processes that are occurring in a knowledge society, so that as players we can not only react appropriately to disruptive innovation (Christensen, Anthony & Roth, 2004) but also proactively shape our destiny.

## **Presentation of the Case Study**

We illuminate the model with a comparative case study (Merriman, 1998) of two methods of learning and achieving accreditation in accountancy in the United Kingdom. The first is of a three year degree course in accountancy, the second through a direct entry route to membership of the British professional accountancy association, the Association of Chartered Certified Accountants (ACCA). The process for an accountancy degree is quite similar to the process for most other degrees in universities. We chose ACCA as an excellent example of what Kirp (2003) has called “the parallel postsecondary universe” (p. 6), picking up the phrase from Adelman (2000). Though Kirp and Adelman were referring specifically to information technology courses such as those leading to Cisco or Microsoft certified engineers, we chose the ACCA as more complex and similar to a degree.

### ***BA Accounting and Finance (Hons)***

The data for the first case are taken from the London Metropolitan University’s (LMU’s) three year (or four year part-time) BA Honours course in Accounting and Finance.

The university runs two semesters a year, with admissions in both semesters. Students must normally be at least 18, with two A levels and two other GCSE passes, which must include English and Mathematics. These requirements may be relaxed for mature students. Two referee reports must also be submitted.

Students study four modules a semester, 24 in all. Students have choices for six of the modules, which may lead to sub-specialty minors (e.g., in forensic accounting).

Each module has a description published on the web that briefly describes the syllabus, learning outcomes, assessment method, teaching aids and a bibliography.

While the summative assessment method has some variations, typically 70% of marks are awarded for a final exam, with 30% for in-term assignments or tests.

Course costs are best illustrated by international student fees (£7,400 per year) as domestic (United Kingdom/European Union) students fees (£1,175) are subsidised by a government grant. There appear to be no other mandatory fees (e.g., student union, admission); textbooks typically cost between £30 and £40 each.

### **ACCA**

The ACCA is one of five accountancy bodies in the United Kingdom whose members may act as “registered auditors”, those who may certify the accounts of companies under the Companies Act. Founded in 1904, the ACCA is older than many contemporary universities. Though it has statutory accreditation only in the United Kingdom and a handful of other countries, its reputation is international: it has 260,000 students and 110,000 members worldwide. It has over 300 exam centres in 170 countries. In Malaysia, for example, 42 institutions (including Universiti Teknologi Mara) are registered with the ACCA as offering tuition for its exams.

Entry to becoming a student of the ACCA is relatively easy, and is partially age-based. Those over 21 can enter via the mature student entry route, which has no pre-requisites. Those over 18 can enter with two A levels and three GCSE passes in different subjects, while those over 16 may take the Certified Accounting Technician (CAT) qualification, which then provides exemption from some of the professional papers. Exemptions are also granted for parts 1 and 2 papers for students who have other appropriate qualifications. Exemption fees are the same as examination fees.

The ACCA’s professional exams are in three parts. The first part has three papers, the second part has six papers and the third part has three core papers, and students must take two

further papers from a choice of four. Exams are held twice yearly. Students may take up to four papers at a time, with the only limitations being that they may not take any part 3 papers until they have passed all the part 1 papers, and that, in general, the three core papers in part 3 must be taken and passed together. Each paper has a single, three hour exam. Students must finish all their exams within 10 years.

The ACCA publishes a syllabus for each paper. It also provides on its website previous question papers, model answer papers and examiners' feedback. Examinations are developed via a sophisticated quality assurance process. Those involved in the examination development process are not allowed to teach students.

Each student receives a percentage score, with 50% being a pass. Assessment is criterion-referenced. On average, about 50% of candidates pass each paper, and pass rates have ranged between 30% and 63% in the last five years.

Students who complete their exams are known as affiliate members. Associate membership is granted to those affiliates who provide evidence of competency in at least 16 of 68 defined areas of competency, demonstrated through a Student Training Record (STR) during at least three years of relevant practical experience, which could be done concurrently with the exams. The STR must be signed by an appropriately qualified supervisor.

Members wishing to undertake "public practice work" must also demonstrate competence in defined elements developed through three years of training in an approved practice, of which at least two years must be post (associate) membership. Evidence is again in the form of a training record, the Practising Certificate Training Record. Members in practice who wish to be Registered Auditors must also complete an Audit Orientation Course and test (AOCT).

Students pay an initial subscription of £59 and an annual subscription of £59. Exam fees are charged on a per paper basis, and are £41, £49 and £59 for papers in parts 1, 2 and 3 respectively. Affiliate members pay a reduced membership fee of £85 for up to three years. Admission to membership incurs a fee of £170 and an annual membership fee of \$170. Training records are assessed at no cost; the AOCT costs £528.75.

The ACCA's website provides links to organisations in the business of providing academic support to students. One such organisation, BPP Holdings PLC, for example, provides a range of options for students, including purpose written textbooks. Students can choose appropriate paper material – a 'swot' book (£10), a revision pack (£15) and/or a full study text (£26). Students may also get further support, selecting full-time (£470-£850), part-time (£200-£425), revision (£230-£400) or home study (£115) options.

Practising members must complete at least 35 hours of continuing professional development (CPD), of which at least 21 hours are spent on "acceptable structured courses". The Association operates a monitoring unit that visits practising members, on average, once in three to five years. It also maintains disciplinary procedures for both members and students.

## **Analysis of the Case Study**

LMU provides the first four elements of our model, and provides a degree at a cost of about £22,000 in three years. The degree does provide some recognition but, as its course profile acknowledges, is of principal value to aspiring professionals to the extent that it provides exemption from the examinations of the professional bodies. Both the LMU and the ACCA provide some flexibility in content, the LMU more so than the ACCA.

The ACCA provides the first, fourth, fifth and sixth elements of our model, and has set up an environment that is conducive to many organisations providing the second and third elements, in an extremely flexible range of delivery modes. A diligent student, learning from a study text, taking three years and passing each paper the first time, would pay only £1,300 in membership, exam and text fees. However, a more comparable approach would be the BPP full-time courses, which would add about another £10,000. Obtaining full accreditation as a registered auditor would cost about another £1,100 and a minimum of two years further experience. The final stage, maintenance, has annual fees of £170 plus the costs of CPD.

The ACCA also places a strong emphasis on workplace-based learning. Workplace-based learning not only has no direct cost to the student, but arguably has significant benefits for both the employer and the students' personal budget.

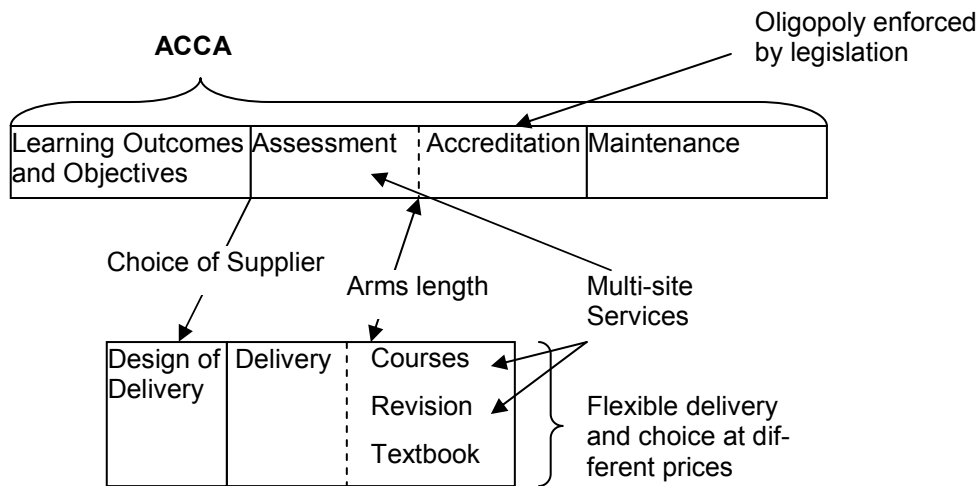


Figure 3: Systematic Learning: The ACCA

## Conclusion

In this paper, we have illustrated a model of systematic learning that we contend is useful for understanding the needs of a knowledge society in the new millennium. Using a comparative case study, we have shown that examples of this model operating relatively economically do exist, and that universities currently deliver only part of this model, and even then in a relatively inflexible and expensive manner. The model illustrates the relatively high costs of delivery methods that rely on face to face teaching, and how separating delivery from the other stages of systematic learning allows alternative modes of flexible delivery to flourish.

At the same time, this model ignores many important issues. Universities deliver research. They offer inter-disciplinary studies. They provide a liberal education. Students need a supportive learning environment to achieve reasonable pass rates.

As such, it would be inappropriate to make conclusions about which method of systematic learning is better or superior, based on this paper. At best, what this paper has sought to do is to facilitate the application of systems thinking to the issue of providing learning to a knowledge society, and to propose a model of systematic learning that provides a lens for thinking differently about these matters.

The new millennium poses many challenges to higher education. If we wish to shape the direction we move in rather than simply react, we need to apply our critical analysis and design skills to understanding the forces and objects at play in transforming higher education and promoting the knowledge society.

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