The role of universities in a digital age

For over a decade now, universities have been aware of the pressures to expand access to higher education. The knowledge society needs more graduates, and those graduates themselves will keep returning to study as lifelong learning takes its place in both work and leisure time. These are the positive pressures for expansion. The knowledge society, fuelled by an expanded HE sector, is generating more knowledge industries, but this in turn creates a competitive pressure. University teaching in this digital age has to cope with the fact that the knowledge industries themselves are creating the means by which individuals can acquire the immediate skills and knowledge those industries need, and cause them to query just what benefit a university education might be, given its cost.

There are some difficult questions for universities wishing to respond to these new demands:

*How should the curriculum balance expert and practitioner knowledge?*
Universities are comfortable with teaching specialist knowledge produced by experts, but practitioner knowledge and the skill to develop it, which is what the knowledge industry needs, is not a natural part of university curricula. Should they move into this area at undergraduate level, as Gibbons et al suggest, or leave it to post-graduate, post-experience provision within the private sector?

*To what extent is a degree course a long-term grounding for an individual?*
A degree certifies the knowledge that graduates have developed when they leave university, but most use very little of this in their subsequent careers. The more enduring qualities are the skills, attitudes, and ways of thinking they derive from their course. But degrees and syllabuses are still defined in terms of subject knowledge, rather than generic skills. Should university courses and teaching focus more on the practise of high-level skills, or leave this to the personal development of individuals through their subsequent work in the knowledge industries?

We must be able to define what distinguishes a university education from what the knowledge industries themselves offer in the form of corporate and ‘for-profit’ universities.

The recent review of UK higher education, conducted by Lord Dearing’s National Committee of Inquiry into Higher Education (Dearing, 1997), reviewed the role of higher education ‘in a learning society’, and defined it as having four main purposes:

- inspiring and enabling individuals to develop their capabilities to the highest levels
- increasing knowledge and understanding
- serving the needs of the economy
- shaping a democratic and civilised society.

The first testifies to the university’s commitment to the long-term personal development of the individual, in contrast with the focus on short-term employment needs that inevitably drives other forms of post-school education, such as corporate training programmes. The second purpose links the twin activities of research and teaching in the development and dissemination of knowledge. The third expresses the economic value of this, and the fourth its cultural value to the society it serves.

For the individual, therefore, universities bring together research and teaching, and a focus on their long-term needs, to offer a clear competitive advantage over what the knowledge industry will do for them.

The unique role of the university in society, embracing these purposes, the Committee defined as being ‘to enable society to maintain an independent understanding of itself and its world’. Each word in that definition was carefully chosen.

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‘Society’ does not confine the university’s role to service of the nation state. This is one of the key changes now in the way that universities relate to their context – once an organ of the nation state, a university now crosses national boundaries in teaching in the way it has always done in research. It also implies that the understanding is widely owned, fully disseminated, not located with some elite, but with society itself, thereby enabling it to become, in the fullest sense, a learning society.

‘Maintain’ suggests a continuing responsibility, but one that is responsive to change, because of what is being maintained – an understanding of society itself, in continual flux, and of its world, for which our theories are in continual development.

‘Of itself and its world’ is inclusive of the full range of the natural, human and social worlds as objects of understanding.

‘Independent’ is there to express the unique position of universities as creators of understanding. There will be many claimants for the role of understanding our society and its world in our new ‘knowledge society’, but most – the media, industrial research units, corporate universities – cannot claim independence from political and commercial interest. The individualistic and disinterested nature of university research and teaching remains unique.

‘Understanding’ expresses the epistemology of a university as knowledge acquired with a sense of responsibility for how it comes to be known, and with the purpose of enabling enhanced action.

This portmanteau definition helps to clarify the unique role of universities for society as a whole. They are distinguished from plausible competitors in the knowledge industries by their universality of scope, by independence of enquiry, and by the nature of their epistemology. Therefore, this section concludes with

**Proposition 1:** Universities will maintain their competitive edge against the knowledge industries through the maintenance of their core values – including research-based teaching, and a curriculum that provides for the long-term cognitive needs of individuals.

**Does university teaching measure up to its role?**

The rhetoric is good, but saying doesn’t make it so. Whenever senior academics are rattled by the pretensions of the private upstarts in the corporate university business, they incline to the view that the degree-awarding powers of universities protect their uniqueness. For a while, perhaps, but governments have the power to change that if universities are not seen to offer something valued and distinctive from the increasing private provision.

Academics have been arguing for a radical shift from the standard transmission model of university teaching for some time. Schön, for example, demonstrated the need for a ‘reflective practicum’ in universities, where students can prepare for their future careers when existing professional knowledge will not fit every case, where practitioners have to make sense of uncertain, unique, or conflicted situations of practice through ‘reflection-in-action’, and they need to be able to go beyond the rules – devising new methods of reasoning, strategies of action, ways of framing problems (Schön, 1987). This presupposes a very different kind of university teaching:

Designing, in the broader sense in which all professional practice is design-like, must be learned by doing. A design-like practice is learnable, but is not teachable by classroom methods... the interventions most useful to students are more like coaching than teaching, as in a reflective practicum... The reflective practicum demands intensity and duration far beyond the normal requirements of a course... A studio, a supervision, an apprenticeship... Students do not so much attend these events as live in them. And the work takes time... time to live through the learning cycles involved in any design-like task; and time to shift repeatedly back and forth between reflection on and in action.

(Schön, 1987)

Similarly, Wenger’s account of a ‘learning community’ emphasises the importance of individual and community engagement in several ways. For the acquisition of knowledge the community must provide three kinds of engagement:
Give newcomers access to competence

Invite a personal experience of engagement

Enable incorporation of competence within participation

and for the creation of knowledge, four further types of engagement:

Explore radically new insights

Mutual engagement around joint enterprise

Strong bond of communal competence

Deep respect for particularity of experience

(Wenger, 1998)

Wenger’s account does not privilege universities with unique access to such characteristics, as the knowledge industries are likely to develop these as well, if they are to succeed. But they will need graduates capable of contributing to the more fluid kind of knowledge creation that the professional practitioner needs, who are not confined to the well-trodden paths of expert consensus knowledge of the traditional university curriculum. Students’ long-term cognitive needs go well beyond the acquisition of consensus knowledge.

There are significant opposing pressures on universities – to demonstrate research success on the one hand, and to provide for wider participation in higher education on the other. The two pressures oppose because research and teaching are seen to be in competition with each other, at the institutional level and at the individual level. In the UK significant funding follows high research ratings, whereas funding for teaching is not related to its quality ratings, so institutions reward good research more than good teaching. Academics have to divide their time between the two activities, the one in which they are professionally qualified and judged by their peers, the other in which neither is the case. Inevitably, research wins. There have been attempts to ignite academics’ interest in professional accreditation of their teaching, by setting up the Institute for Learning and Teaching in the UK, but interest is minimal; it is not yet on a transformational path.

Proposition 2: Universities are not maintaining a professional approach to teaching to parallel that for research, and the curriculum is not sufficiently oriented towards long-term high-level cognitive skills.

The challenges to university teaching

Our teaching methods have not evolved sufficiently to keep pace with what is needed. The dominant model is still the transmission model, with the dominant learning technologies still being those it has spawned: the lecture, the book, the marked assignment. Academics have been under such pressure to meet research demands and teach larger numbers, that they have been unable to go beyond the traditional forms of academic teaching. We have begun at last to play with digital technologies as a way of meeting the demands of the digital age, but with an approach born of the transmission model still. The academic community has not redefined what counts as higher learning, and therefore cannot draft the specification for how the new technology should do anything other than what learning technology has always done – transmit the academic’s knowledge to the student. With each new technological device – word processing, interactive video, hypertext, multimedia, the Web… - the academic world has called each one into the service of the transmission model of learning. The adaptive potential of the technology to serve a different kind of learning cannot be exploited by an academic community that clings only to what it knows. The academy, with respect to the professional practice of teaching, is not a reflective practicum. There is no progress, therefore, in how we teach, despite what might be possible with the technology.

What is the difference between a curriculum that teaches what is known, and one that teaches how to come to know? Knowledge, even academic knowledge, is not adequately represented as propositional statements, but has a historicity for the individual that incorporates their previous experience, their perception of the immediate situation, their own intentions, and the lived experience of discovery, of recognised tensions, of uncertainties, of ambiguities still unresolved – this is not situated learning only, nor discovery learning, nor meta-learning. It comes closer to scholarship as learning. It requires a reflective practicum for the learning process. But for that to be possible, university teachers have to renew and
develop their model of the learning process well beyond the traditional transmission model. It requires an approach to teaching that turns academics themselves into reflective practitioners with respect to their teaching. In the context of research they would certainly describe themselves as reflective practitioners. As researchers, they are consummate professionals:

(i) fully trained through an apprenticeship programme, giving them access to competence, and personal engagement with the skills of scholarship in their field;

(ii) highly knowledgeable in some specialist area;

(iii) licensed to practice as both practitioner and mentor to others in the field;

(iv) building on the work of others in their field whenever they begin new work;

(v) conducting practical work using the agreed protocols and standards of evidence of their field;

(vi) working in collaborative teams of respected peers;

(vii) seeking new insights and ways of rethinking their field;

(viii) disseminating findings for peer review and use by others;

In the context of research, academics measure up well to Schön’s and Wenger’s ideals. Now run through that list again for the context of university teaching. How many of those eight characteristics of the reflective practitioner contributing to a learning community typically apply to the academic as teacher of their subject? None; not even (ii), since in this context it should refer to a specialism in the pedagogy of their subject, not relying simply on their academic knowledge. It is tough for academics who are under pressure to address this as an aspect of their professionalism, but if there is to be innovation and change in university teaching, as new technology requires, as the knowledge industry requires, and as students demand, then it follows that academics must become researchers in teaching.

Proposition 3: University teaching must aspire to a realignment of research and teaching, and to teaching methods that support students in the generic skills of scholarship, not mere acquisition of knowledge.

What could be possible?

I have argued elsewhere that a Conversational Framework for learning offers a more progressive model than the transmission model, and is more compatible with the requirements of the reflective practicum that we must aspire to (Laurillard, 2001). It fits the ideal of university education, which is what academics certainly aspire to, for all that they do not practise it. And it provides a framework against which we can specify what the digital technologies should be doing to support this more elaborate model. It captures the essence of university teaching as an iterative dialogue between teacher and student(s), operating on two levels, the discursive, theoretical, conceptual level, and the active, practical, experiential level, the two levels being bridged by each participant engaging in the processes of adaptation (of practice in relation to theory) and reflection (on theory in the light of practice).

The iterative dialogue of the Conversational Framework is expressed as a diagram in Figure 1, against which we can test a range of different kinds of learning technology.

- See Figure 1 -

The Conversational Framework describes the irreducible minimum for academic learning. The interplay between theory and practice is essential ‘making the abstract concrete’, as Mitchell Resnick put it. And the continually iterative dialogue between teacher and student is essential if the student is to be sure that they have understood the teacher’s concept. The transmission model – the expression of the teacher’s concept – is just one part of a much more complex model for learning as shared understanding.

Taking these dialogic activities as the criteria for the reflective practicum and the learning community, we can test how well some of the more ambitious uses of the technology measure up to these requirements. To what extent can a particular ICT format support the full Conversational Framework. We can immediately see that many of the more ubiquitous forms
offer no more than the traditional presentational media of print and lecture that serve only the
transmission activity. Lecture notes on the web, and CD-based digital resources are two
examples of this. However, if we exploit the communicative and adaptive capabilities of new
technology in carefully integrated combinations, then they can meet the requirements of most
of the activities in the Conversational Framework. Then they can transform the learning
experience to one that fits better with the requirements of the digital age.

Different learning technology models cover different combinations of activities within the
Framework. When sufficient design time is given to challenging the technology to meet these
more progressive academic ideals, then something more than ‘lecture notes on the Web’ is
possible. Design has to be generated from the learning objectives and the aspirations of the
course, rather than from the capability of the technology. Courses at the Open University
have provided several opportunities for exploiting the technology in the service of specific
types of learning activity that students need to engage in. Examples are shown in Figures 2 to
6. In each case the communicative, interactive and adaptive capabilities of the technology
facilitate different kinds of iterative dialogue between teachers and students. The practical
exercises of investigating and analysing resources, and running simulations are combined
with theoretical and conceptual discussions within the community, either synchronously or
asynchronously.

Figure 2 shows a complex environment of ‘reservoirs’ through which a carbon atom
moves via transformational process such as ‘burning – from land plants to atmosphere’ or
‘absorption – from atmosphere to sea’, and so on. The task goal is to move the atom
through all twelve reservoirs in the environment. The action is to select a suitable next
reservoir and its appropriate process. There is feedback in the form of successful
transition, video clips of each process in action, and a record of reservoirs as yet
unvisited. In its generic form, the objective being met here is to learn the sequence and
transformational processes within a cyclical system. The same pedagogic form could be
used for quite different content, such as the osmosis cycle, or the development of an
individual.

Figure 3 shows the beginning of an environment for investigating relationships between
literary resources from the Homeric poems, and artefacts from archaeological sites of
ancient Greece. Each week’s work defines a set of investigation activities, such as
‘compare the mortal characters in the Iliad and the Odyssey’, and ‘investigate the kind of
society in Mycenae’, which students use search facilities through the digitised resources,
guided by advice on what to look for, and how much material to use. They use a Notepad
facility to take notes on what they find, and once sufficient notes have been collected they
can consult model answers. Using these, they may then continue their search or refine
their notes. Again, the pedagogic form could be applied to any other digitised content, the
academic supplying some appropriate investigation activities and matching model
answers.

Figure 4 shows the form of an online asynchronous reading group. Students can read the
article supplied, and may comment on it using a comment button to link to a threaded
discussion around the structure of the article, and around some key questions defined by
the tutor. The academic has to supply the text, define the key questions, and contribute to
the discussion.

Figure 5 shows the same environment adapted to discussion of a runnable simulation.
This format combines both the communicative and adaptive capabilities of learning
technology. The academic supplies the simulation model, and the task goal – e.g., find the
optimal parameters for these conditions – and the interactive model provides the
feedback to the student on their input. The student can use the comment button in this
case to link to a threaded discussion around the structure of the simulation or the task.
The format here allows iterative dialogue at the conceptual level, and interactive
experimentation at the practical level.

Figure 6 shows a synchronous discussion environment around a shared visual space.
Students use a headset and both audio and data are transmitted via a single modem,
using audio on the Web. Students or tutors may submit anything to the shared space - in
this case a website – including a text, or diagram, or picture, and may use the tools on
offer for collaborative design – e.g. a concept-mapping tool. The academic may specify
the form of the group, the task, and the visuals.

The practice of high-level cognitive skills can be supported through these more radical design
formats for learning technologies. Each of these addresses most of the activities in the
Conversational Framework, and therefore supports a more complex learning experience than
print, or lectures, or simple webpages. We need to be able to offer this more elaborate kind of
learning experience on a mass basis. Technology is capable of doing that, as it is essentially
a mass-oriented device. But it cannot do it unless academics find a way of using this new tool
more effectively.

**Proposition 4**: Learning technologies can support students in the forms of learning that
contribute to the high-level cognitive skills of scholarship, and the practitioner-based skills
and knowledge of design-like practice.

**How might this be realised?**

Designing learning technology models that are innovative and effective, that exploit the
technology, and that address the expectations of the knowledge industry, is an additional
burden for academics. How is this to be possible?

The problem is that teaching does not invent its tools, it uses those invented by others. The
academy had language, but it didn’t invent writing – traders did that. It had writing but it didn’t
invent books – administrators did that. It didn’t invent computers – engineers did that. It didn’t
invent the internet – the military did that. It did invent the Web, but not for teaching purposes.
All those technologies have been adopted by the teaching professions, but all of them in the
service of the transmission model of learning. We have to conclude that it is not a natural part
of the process of teaching that its practitioners invent tools for the improvement of that
practice.

There is an alternative approach to the individual struggling to discover how best to use a
complex technology. All technologies create communities that invent a range of formats within
which practitioners can craft a variety of contents – e.g. types of book, types of TV
programme, types of PC application, etc. We need the same for learning technologies. But
these devices grow organically. They are not designed in the abstract, as say, authoring
systems were. They begin life in the excitement of creativity and the intention to do something
different. That is how new teaching designs should begin, and was true for all the examples
referred to above. But they should not stay rooted in the particularity of the original design.
The beauty of computer programs is that they can endure as a form, a tool for others to
design by. So the program that began as a way of enlivening the study of Homer could be
generalised to become a tool for enabling students to ‘undertake guided investigations of a
range of resource material in order to develop their own analysis of each investigation’. And
as a design tool, it then becomes usable by academics in the same way as a book format, or
a small group format can be. Similarly, the program that began as a way of challenging
students to drive a carbon atom through its stages of transition between different ‘reservoirs’
could become a tool that other academics customise for a quite different content, while
preserving the form of identifying appropriate transition processes in a dynamic system. The
form of the learning activity, already tested and proven, remains the same. The content may
cover a wide range of different topics.

There will be many such forms – possibly hundreds across the full range of the university
curricula. These could be adapted to their generic form to provide design tools for academics
to use in their teaching much as they currently use Powerpoint for presentations. As we have
seen, each of the programs in Figures 2 to 5 could offer a generic learning activity model:

- Exercise on identifying the process changes that an object must go through in moving
  from one context to another.

- Guided investigation and analysis of the relations between digitised source materials, with
  model answers as feedback.

- A digital document discussion environment for any text, or article, offering discussion
  around the structure of the article, and defined general topics.
A digital document discussion environment for a runnable simulation, offering discussion around the structure of the simulation, and defined general topics

A synchronous discussion environment for a small group talking around a set of shared resources.

In each case, the academic has to provide the content and ideas appropriate for the particular learning activities they want to design, as they do for the generic form of a book, a lecture, or a powerpoint presentation for less active forms of learning. They need relatively little programmer support. The pedagogical design is already embedded in the generic form. It is their design task to customise the content. In such a way, we should also be able to capture the generic forms that facilitate the culture of enquiry and professional practice.

The proposal that an academic could become a professional in the sense of being a reflective practitioner in the pedagogy of their subject is now more feasible. Such generic learning activity models\(^2\) (GLAMs) embody good pedagogic practice from the original design and evaluation process, so they act as a way of enabling professionals to share ideas, and build on each others’ work. This is the beginning of the kind of collective R&D programme that we will need to generate innovative and effective teaching. If the OKI (Open Knowledge Initiative) led by MIT, can function as a knowledge-building community, defining the design standards of good pedagogy in the use of learning technologies, then we would really have a reflective practicum for teaching.

*Proposition 5*: Academics need a collective R&D programme that builds design tools (GLAMs) for supporting students in learning the skills of scholarship.

Would academics accept such a programme? Perhaps. Academics, like all professionals, work to the system they find themselves in. If universities facilitated and rewarded a highly professional approach to teaching, then academics would respond to that. Without it, they will respond to what the system does reward, namely a professional approach to research only.

*Proposition 6*: Universities must support a professional approach to teaching that mirrors that for research.

**A new approach to university teaching**

Propositions 5 and 6 would constitute a new approach to university teaching, if adopted. The technology can only do so much. On its own, it cannot offer academics what they need to adapt their teaching to the needs of the digital age. With this new approach they would be able to do more. For this to be successful, there has to be a common understanding of the nature of learning at university, an acceptance that teachers must become reflective practitioners themselves, and an intention by university management to create the conditions in their systems that foster and reward this rather different kind of approach. Without it, new technology will not serve universities in meeting the challenge of mass HE and lifelong learning for the knowledge society. The digital age will find its own ways of managing without us.

**References**


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\(^2\)‘GLAMs’ is not an attractive acronym. ‘Designs’ instead of ‘models’ is no better – GLADs?? ‘Customisable’ instead of ‘generic’ gives CLAMs, which has all the wrong connotations. There must be a better way of putting this.
Figure 1: The Conversational Framework identifying the main activities necessary to complete the learning process.

Figure 2: Exercise on identifying the process changes (e.g. burning) that an object (e.g. carbon atom) must go through in moving from one context (e.g. atmosphere) to another (e.g. land animals).
Investigation activities

Figure 3: Guided investigation (e.g. descriptions of characters) and analysis of the relations (e.g. comparative evidence of social relations) between digitised source materials (e.g. poetry, artefacts), with model answers (e.g. academic's and experts' views) as feedback.

Figure 4: A digital document discussion environment for any text, or article, offering discussion around the structure of the article, and defined general topics.
Structured topics for discussion

Interactive simulation annotated with links to topics for discussion

Figure 5: A digital document discussion environment for a runnable simulation, offering discussion around the structure of the simulation, and defined general topics.

Planning tools for use in shared space

Members currently online via audio link

Web page copied in for members to share

Figure 6: A synchronous discussion environment for a small group talking around a set of shared resources (e.g. a website).