

Editorial

Practice-bounded Knowledge

Where vocational subjects are taught in universities the balance between education and skill-development is rarely likely to be stable. Academics and practitioners work to different incentives created by organisations that are trying to optimise very different goals. The more well-established a subject becomes as an academic endeavour, the greater the risk of divergence between skills and educational agenda. The process of curriculum adjustment can be slow and insensitive to demands in the work place, especially where universities are not obliged (by regulation, contract or competition) to deliver graduates with specific minimum skills (see below). Where the gap between graduate qualities supplied and graduate qualities demanded becomes large enough (call it the graduate quality gap - GQ-gap), something will give. There may be a crisis in the existing supply mechanisms, for example, desertion of undergraduates. More likely, for parents and students are informed to a greater extent by university marketing than professional debates, students will keep enrolling but find themselves less than optimally skilled and possibly at a disadvantage compared to graduates from other disciplines. The more powerful feedback mechanisms are likely to be the voice of government (especially where there are public safety issues), employers and to some extent, the professions. I comment on these in reverse order.

A professional body's ability to intermediate the GQ-gap is limited in at least two ways because its power over university curricula can only run so far. First, a professional body may have a degree of control over nominal curriculum design but much less control over what actually gets taught. Teachers have immense scope for shaping an agreed curriculum to their own specifications – to their own research interests and epistemological, ontological and methodological preferences. A professional accreditation system that controlled at this level of detail would be far too costly to organise and police. Second, the threat of withdrawing accreditation is effective to the degree that a professional body has monopoly power in the work place (through a strong professional culture or legally endorsed registration). This will be the case where the rationale for professional labelling is the protection of public safety as is most clearly the case in medicine¹. Where professional protectionism is justified more

¹ The relationship between a profession's power over curricula and its responsibility for public safety is an interesting and complex one. In societies governed by the rule of law and private property, there is in general a tendency over time for liability to be distributed and risk allocated to those who can most influence it. A structural engineer will sign off the design of a beam; a cladding manufacturer will specify the fixing, climatological and usage conditions under which it will assume responsibility for the material's failure; a project accountant signs off the accounts and a financial advisor signs off a funding plan both thereby assuming liability for certain kinds of risk. When an architect signs off a plan, the acceptance of liability is a little less clear than with the structural engineer. In Malaysia, urban planners have state power to sign off plans but it is very unclear what specific liabilities they are assuming when they do so. If the architect is

generally by the maintenance of standards, employers will choose to exercise their own judgement on a recruitment strategy consistent with their own standards. They will employ staff with and without professional status and the profession's hold on university curricula is weakened. The internationalisation of the labour market adds its own challenge to curriculum control. It may lead employers down the route of evaluating graduate quality on a case by case basis (eroding the power of the accreditation label). It may also lead to international competition between accreditation regimes, which will have an impact on standards. Without a strong monopoly, a profession will be more inclined to act like a competitive firm that adopts strategies to win recruits, maximise numbers and revenue and actively innovating and promoting the benefits of membership. Witness the aggressive and creative domestic and international marketing of two UK professional bodies: the Royal Institute of Chartered Surveyors (RICS) and the Royal Town Planning Institute (RTPI).

The UK's recent urban renaissance, brought about among other things, by sustained economic growth, Europeanisation of urban culture and strong government control of green field development², has had a profound influence on the types of skills demanded of graduates coming into the urban professions. Employers want generalists, flexibly skilled in project management, finance, negotiation, design, community organisation, public-private-community partnerships and spatial planning (ODPM, 2004, McIntosh and Bailey, 2003). A senior partner in one of the UK's top construction firms and a celebrity civil engineer recently told an industry think tank³ that his best three high flying new recruits included a history graduate and a geography graduate from a famous university. The message to universities was clear – give us creative, intelligent and flexible graduates who can learn many of the more specific professional skills on the job. There is evidence of the same kind of demand for a new 'urban professional'⁴ in other European countries⁵.

employed directly by a client to see a project through to completion, he or she is effectively co-ordinating the construction process using the tool of design. Liability is lessened by passing it on to subcontracted professional and trade firms more able to lower risk. Even if risk is widely distributed in this way, the project managing architect must in principle be held liable in law for some aspects of the project's co-ordination – the legal gaps at the boundaries of each specialist's liability. Registration of the architectural profession therefore has a clear public safety rationale, notwithstanding the rising importance of design and build contracts where architects are employed by contractors to deliver specific design inputs. As result, the profession enjoys monopoly power in the classroom and in the workplace.

² Since the early 1990s, government planning policy has squeezed house builders into cities where they have had to look for so called brown field sites, many of them difficult and costly to develop. The result has been innovation, new partnerships between private and public agencies and a renewed emphasis on the quality of building and site design to compensate residential buyers for the lack of space.

³ Centre for the Built Environment/ Construction Industry Council Education College forum 2004

⁴ For an example of the new urban professional movement, see the Academy of Urbanism: <http://www.academyofurbanism.org.uk/public/>

⁵ Another Academy – the Academy for Sustainable Communities, created by the UK Office of the Deputy Prime Minister (now the DCLG) commissioned research in July 2006 looking into the European skills gap for sustainable community development.

The UK government has picked up the message from employers (in the private, public and voluntary sectors) and from its own investigation – particularly a report into the skill capacity for delivering its national sustainable community plan (ODPM, 2004). Among other responses it has provided bursaries to attract better quality graduates onto Masters programmes in Planning and initiated a campaign to change the culture of planning (from an emphasis on bureaucratic regulation (negative planning) to creative place-making (positive planning). In this the government departments have worked with the Royal Town Planning Institute, which recently embarked on an enlightened major image and mission revamp, including a radical overhaul of the way it accredits university education.

The professions, employers and governments all have their role in aligning university curricula to the needs of society. And of course, universities themselves, schools and individual academics have their own incentives to address the alignment. The signals governing the various interventions are noisy, however, and the interventions are often coarsely targeted and hard to monitor and police. Those whose actions they seek to influence can be expected to manipulate incentives, regulations and other measures for their own interests.

Abstracting from the details, we should see in all of this a complex process of social learning and knowledge development. Given the growing complexity of 19th century society, it was inevitable that architecture and urban planning should become subjects taught and developed at universities⁶. Following the increasing technological, financial, legal and organisational sophistication of construction projects in the 1960s it was inevitable that surveying, construction management and property should become subjects of university scholarship⁷. It was also inevitable that academic scholarship should lead to divergence in university and professional missions⁸; and that there should be attempts to correct this. Society learns how to build knowledge and train specialised workers through a process of trial and error and the GQ-gap might be expected to fluctuate over time with a smoothness or unevenness determined by the quality of feedback mechanisms and the information they convey. Whether or not this is bound to lead to Popperian style positive social learning and a gradual improvement in the efficiency of the institutions that create knowledge is a fascinating research question. A cautionary note should be taken, however, from Fudenberg and Maskin's (1986) game-theoretic *Folk Theorem* which shows that sequences of good and bad

⁶ The first architecture school in the UK opened in 1847 with the first proper university course starting in first decade of the twentieth century, about the same time as the first university planning school (Civic Design opened at Liverpool University in 1909).

⁷ University schools of surveying and property, emerged in the 1960s in Britain, to occupy intellectual and pedagogic space between architecture, civil engineering and planning.

⁸ In Britain, the Research Assessment Exercise (RAE) often comes up in conversations as a cause of this divergence since it has encouraged academics to concentrate on research rather than teaching; encouraged them to pursue scholarly agendas distant from the real concerns of practitioners; and inhibited the movement between practice and academia. It has probably exacerbated a problem that was there already, however, speeding up the divergence.

strategies can persist as equilibria as societies develop. Karl Popper's idea of society as a laboratory in which good collective action strategies are learnt over time, plausibly presupposes progressive feedback about the improvements of each successive problem-policy-problem cycle.

Consider next, the way in which these processes help govern changes in the *substance* of knowledge. Most kinds of knowledge are created as much in the world of work and play as in the world of academic scholarship. All the more so at times of rapid technological change such as we are now in. Perhaps during times of slower technological advance, more knowledge was generated in ivory towers. However, philosophical and theoretical advances have probably been most rapid in history during periods of social change – developing answers to questions faced as people co-operate with each other in the exchange of raw materials, goods and skills. The evolution of knowledge necessarily involves a conversation between academe and industry – be it cooperative or dialectic.

The historical professions are under threat from new social necessities requiring new skill mixes and alliances. The capacity of the knowledge economy to generate useful knowledge exceeds that of universities (whose job it arguably is to codify, order and abstract from it in order to refine it and disseminate it). Similarly, traditional academic subject boundaries are under threat from technological innovations. To advance the *genome project* biologists, chemists, computer scientists, mathematicians and physicists have had to pool their knowledge in new ways and this is having an impact on the way universities organise research and teaching and on the boundaries of knowledge domains. In the laboratory sciences there is therefore a struggle going on as boundaries evolve driven by forces beyond the control of journal editors, professional associations and individual academics. I have already alluded to a similar struggle in the built environment, where there is much talk about knowledge and professional *silos* and how to break out of them into constructive interdisciplinarity. Into this debate, let me say something positive about knowledge boundaries.

Everything is connected to everything else. James Lovelock's (1979) and Lynn Margulis' (1998) *Gaia* hypothesis epitomises the popularisation of post Newtonian science: drawing reference from Greek mythology to convey a theory that the organic and inorganic are interconnected in complex dependencies that shape the biosphere and maintain an environment suitable for life. Interconnectivity became a field of scholarship in the 1960s and from cybernetics and other influences grew catastrophe theory, then chaos theory and then complexity theory. Well before these endeavours, the classical economists of the 18th century and their medieval antecedents in the Spanish monastic-economist school of Salamanca understood something of the way complex social and economic order evolves through individual transactions. The ancient and modern idea of global order emerging spontaneously from local decisions raises an important question. If all things are connected by complex dynamics then any scholarship that seeks to understand these dynamics must always and eventually find

itself studying *everything*. Like the observation by mathematician, clergyman and author Charles Dodgson (Lewis Carroll) that the perfect map would be at a scale of 1:1, perfect knowledge would be infinite in its complexity. For obvious reasons, therefore, reductionism is inevitable; and with reductionism, disciplinary boundaries. Subject and professional boundaries are necessary to reduce the costs of creating, codifying, refining and disseminating knowledge. If disciplines and professions were somehow abolished, they would soon re-emerge of necessity. And if reductionism were somehow abolished (a sentiment that is currently in fashion among many scholars), it would soon re-emerge. Prior to Einstein, reductionism ran a particular course that maintained its influence throughout the twentieth century. The all pervading neo-classical paradigm of the economists is a case in point – the view of the economy as an equilibrating machine has come to dominate the discipline and still hangs on in the face of an increasingly influential (and practically more useful) new theoretical heterodoxy. Reductionism is still necessary, however, in scholarship influenced by systems thinking, non-linearity, feedback, evolution and other complexity ideas. So where do we draw the lines? Where do we deal with a sub-system and choose to ignore or control for the infinite number of other sub-systems that impact on our own focus of scholarship?

One answer is found in practice. Take medicine for example. More than ever before, the interconnectivity in the human body is understood. The cardio-vascular system, nervous system, immune system, emotions, diet, muscular-skeletal systems and so on are intricately and subtly linked. Various medical paradigms compete to guide practitioners and practitioners help shape paradigms, each of which draws its sub-system boundaries differently. Holistic medicine sets the boundary wide, viewing a person as a complex whole. Even within this paradigm however, specialists focus on sub systems: reflexology seeing in the sole of the foot a map of the entire body system, homeopathy focusing on the effect of micro-substances on body pathologies. Allopathic medicine (main stream western medicine) stands in opposition to homeopathy. The latter treats diseases by administering in micro quantities, drugs that produce the *same* symptoms as the disease when given in large doses. The former uses remedies that produce effects that are *different* from (counter to) the pathological condition being treated. Allopathy has given us the body subsystems found on signs in hospital corridors and chapter headings in text books: neurology, radiology, ENT, cardiology, physiotherapy, hematology and so on.

The long standing (and recently revived) competition between allopathy and homeopathy illustrates the importance of practice in defining knowledge sub-systems and scholarship boundaries. Samuel Hahnemann (1755-1843), a German physician concerned about the dangers of conventional medicine in the 18th century experimented with his *law of similars*. The approach caught on, probably because it was very much less dangerous than phlebotomy (blood letting), leaching and other conventional practices of the time. By the turn of the twentieth century, however, the

numbers of homeopath practitioners had started to decline and the last school in the 19th century tradition of the practice closed in the 1920s (Haller, 2005). For most of the twentieth century, modern scientific development led by advances in measurement and investigation technologies, drug discoveries, the application of randomized control trials and so on, established allopathy as a dominant paradigm. Practice suggests theory; theory guides practice and practice tests theory. Practitioners compete for custom, for fame, to uphold what they view to be true and as they do, they establish competing boundaries of knowledge. Bounding a medical sub-system within a larger complex whole is okay if it works. Acupuncture is enjoying rising status among medical orthodoxy because there is some evidence from randomized control trials that the sub-system of knowledge required to practice it produces effective remedies. In a neuro-physiotherapy degree scheme it is justifiable to focus the curriculum on neuroscience, plasticity of the brain and the learning effects of exercise – a very partial view of the body - because therapy based on an understanding of these sub-systems can be shown to remedy certain neurological disorders – helping a stroke victim learn how to walk again, for example.

The principal point I want to make from this digression into medicine is that competition among practitioners helps test knowledge boundaries⁹. Without competition between the consumers of the codified knowledge that flows from universities and other research organizations, there would be little incentive to innovate in the ivory towers and knowledge development would suffer. Think of what happened in medieval Europe when religious authorities tried to control both the generation and use of knowledge, or in pre-modern China when bureaucratic control of the curriculum stifled the inventiveness that might have brought about an early industrial revolution. Practitioners test not only specific bits of knowledge – like a new approach to estimating quantities in a construction project or a new route assignment algorithm in traffic modelling: over time they also test the boundaries of knowledge themselves. We are witnessing a profound shake up in the way knowledge is organized in society and in the academe. Our small discussions within the built environment are part of it. Professions competing for trade are part of it. The rise of the multidisciplinary degree scheme is part of it, as is the break-down of traditional subject-based departments and industry's call for multi-skilled flexible generalists.

The French philosopher Michel Foucault (1926-1984) saw the history of knowledge as a history of evolving and competing *discourses* – systems of thought in which individual propositions, statements and theories take on particular meanings constructed by culture and underlying ideas about truth and what is right. His idea has similarities to Thomas Kuhn's *paradigms*, but emphasizes the power-relations behind the construction of knowledge. Kuhn tells us that knowledge evolves in a non-linear

⁹ This Hayekian idea first emerged in a public conversation I had at Seoul National University with Niraj Verma, professor of planning at University of Southern California.

fashion, characterized by sudden revolutionary changes as old understandings give way to new and old facts and theories are revisited. Foucault tells us that knowledge evolution is shaped by the power of its users and generators. There are undoubtedly some *paradigm shifts* behind the current shake up of knowledge domains. The complexity paradigm, for example, draws new lines across the disciplines, as does holism in medicine and institutionalism in the social sciences. Competing *discourses* are also important in the shake up – especially in vocational subjects where differences in professional language and culture have tended to create barriers that are not fundamentally paradigmatic in the Kuhnian sense. Kingman Brewster, American ambassador to Britain, once commented that “Incomprehensible jargon is the hallmark of a profession”. Professional jargon that obscures and complicates should probably be seen as a defensive posture and is a social inefficiency. This is different from the technical languages that naturally evolve as part of a professional discourse in order to reduce the costs of communication. A shuffling and jostling of professional and subject boundaries can have the positive effect of simplifying professional language and bringing fresh insights to bear on familiar problems.

One conclusion from all this is that we should welcome competition between the professional bodies, between universities and between professional firms. It can only improve the fit between codified-taught knowledge and used knowledge – reducing the GQ-gap. With competition comes diversity of product – diverse graduates for diverse needs. Another conclusion is that we should welcome co-operation and partnership between professional bodies, universities and employers. Firms and other organizations form and grow to reduce the costs of market-based transactions between the holders of the different bits of knowledge required to make a product or deliver a service. Lecturers pool rights to their labour and join a university ‘firm’ because it is less costly than delivering their service as a sole trader (involving searching for students, organizing a venue, purchasing equipment and insurance and so on). There are transaction cost savings too from re-drawing professional and subject boundaries. Specialisation is important but can outdo its usefulness when it fails to draw on insights from other specialists. Social scientists need to work in teams to address urban problems in the same way as teams of scientists are needed explore and exploit nanotechnology or chemical computers. Professionals in the built environment increasingly work in multi-disciplinary teams presumably because that is proving to be more efficient. If it continues to prove more efficient (delivering a superior product at less cost), then it will represent an evolutionary step in the way knowledge is used and generated. The built environment academe will have to decide on which bits of knowledge are best learnt as specialisms (for example, design skills, legal skills, specific numerical analysis skills) and which through multi-professional education, perhaps work-based, or through cross-disciplinary simulations in universities. It will have to pay more attention to the shape of knowledge boundaries emerging from practice- not to do so risks losing the vocational rationale for the academic subject. That would lead to some planning departments mutating into general urban studies

departments; some surveying departments becoming specialized business schools and some architecture departments becoming fine art establishments. That may well be a good choice for some schools, which could then specialize in the translation of more general theoretical ideas into applied urban management and design theory. The risk is that this would become increasingly irrelevant to any intended users. Most high science needs to be earthed in some way. High science in an applied field doesn't make sense and even the most sophisticated (and well resourced) schools should therefore submit to the discipline of practice in shaping knowledge and shaping graduates.

Chris Webster, Editor

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