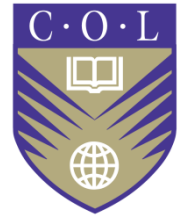


Innovation in Higher Education: has it a Scientific Basis?



*Managing Change in a Global Knowledge Economy
Science and Innovation*

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Introduction

It is a pleasure to be here with you today and to bring you greetings from the Commonwealth of Learning, most especially from our Vice-President, Professor Asha Kanwar, who helped to organise previous workshops here in her capacity as our Higher Education specialist and has contributed to these remarks. This is seventh time that we have joined with the Association of Commonwealth Universities, the University of Abertay Dundee, the Association of African Universities and other Scottish institutions in offering a management workshop for vice-chancellors and other senior university administrators. Until last year we focused on Africa, but we have now broadened out to the whole Commonwealth, which should make for an even richer discussion.

Last year was a special type of meeting, because this event immediately preceded the G8 Summit at nearby Gleneagles. Instead of holding a workshop on management we had the participants draw up an agenda for the renewal of African universities. We knew that the G8 meeting would have a strong focus on the development of Africa and we wanted to be sure that the renaissance of Africa's universities had its proper place in the priorities enunciated by world leaders. I think that we can take some pride in the impact of last year's Abertay meeting on subsequent events.

This year we are again in workshop format, with pan-Commonwealth participation and a focus on science. As people have focussed on developing an agenda for the renewal of higher education in Africa the importance of stressing education and training in science and technology has become increasingly clear.

The main reason, of course, is that the modern world is rich in science and technology, so people and societies that can't speak that language are condemned to live outside the mainstream of the century. But second, the degradation of African universities over recent decades had a particularly dire effect on the teaching of science and technology because of the difficulty of maintaining labs and journal subscriptions, not to mention the difficulty of attracting gifted African scientists to academic careers in Africa.

Others will lead your discussions about how your universities can engage more effectively with science and innovation. In my remarks I want to ask the meta-question; who guards the guardians? By that I mean what about innovation in the way the university organises its own affairs? As VCs and administrators you are all managing change; you are all innovating. I want to reflect with you on the simple question: does innovation in the university have a scientific basis or, when we make changes, are we simply operating on whim, hunch or prejudice?

I shall begin by talking about research on universities - as opposed to research in universities - to make the point that in relation to its size the higher education industry conducts remarkably little research on itself. Clearly this is a handicap if you want to take a scientific approach to university management.

After that I shall look at some of the drivers of change in universities, the global trends that will affect university systems in the first part of this century. Even if these trends do not affect your university directly they will certainly change it indirectly as the academic environment around you changes. I shall ask what scientific basis you have for reacting to those trends.

The trends I have selected are the growth of private, for-profit higher education; the expansion of distance education; and the development of cross-border education. The latter will lead me to talk about a relatively new phenomenon which offers tremendous opportunities for you to leapfrog developments in teaching and learning, namely the multiplication of open educational resources.

Research on higher education - why so little?

So let's begin with research on higher education. Despite the stalwart work of various national and international learned societies for the study of higher education and for institutional research, as well as a number of national and international journals, the volume of research is low for such a large industry. Why is this?

Academics are the mainstay of research in almost all other fields of human endeavour, why do they conduct so little research on themselves and their institutions? I invite you to reflect on that question in the next few days. My own answer is that centuries ago universities developed an approach to teaching that is stable and flexible. It is called the lecture and its primary feature is that a single individual conducts the five operations that constitute the act of teaching.

First the lecturer plans the curriculum for the course, that is to say decides on its content. Second, she or he prepares any materials needed for the lectures, such as slides and handouts and then, third, teaches the lesson. Later on the lecturer usually assesses what the students have learned and, in a fifth and final step, evaluates the whole process and updates it as necessary before giving the lectures again. This approach

assumed that the students would take advantage of the opportunities for study on offer and take responsibility for their own learning.

This is a flexible approach to teaching that maximises the autonomy of the individual lecturer. Until a few decades ago everyone took this approach for granted. It was supplemented by tutorial sessions for individuals or groups in some universities but these again assumed that students would take most of the responsibility for their own learning drawing on the academic staff as guides.

All this was fine in the period when only a small proportion of the population - nearly all young adults - aspired to or could afford to go to university. Many developing countries are still in this situation with Age Participation Rates (the proportion of people in the 18-23 year-old age cohort going into higher education) below 10%.

However, in the last 40 years participation in higher education has increased dramatically in the richer countries of the world and is now around 50% in most OECD countries. But I stress that this expansion took place in rich countries that could, by and large, afford to expand higher education on the basis of the lecture method that I just described. As numbers grew some of the tutorial support fell by the wayside and more students were packed into each lecture hall but the model remained the same.

More recently still, as numbers have continued to climb, most rich-country governments have found they cannot afford to fund higher education at the same level per capita. Their answer has been to transfer more of the cost to the students in the form of fees, either by raising fees in state-run institutions or by encouraging - or at least allowing - the development of private, for profit institutions.

Perhaps because of the lack of a tradition of research and development focused on higher education, few people have asked whether alternative approaches to higher education might change the traditional economic model towards greater effectiveness and efficiency.

Most have assumed that higher education is locked in an iron triangle defined by the vectors of access, quality and cost. This iron triangle emphasises the limitations of the lecture method and explains why countries are finding the expansion of higher education expensive. Suppose that you simply increase access by admitting more students. Numbers grow but the recruitment, training and payment of lecturers cannot keep pace. Class sizes increase and people will allege that the quality of learning has gone down.

Suppose that you try to increase quality by providing more books and learning materials in support of the lectures. The cost of teaching will go up which means either fewer students or higher fees. You get my general point, which is that if you try to improve one side of this triangle your action usually changes the other two sides in undesirable ways. For this reason we refer to it as the iron triangle. It has been a straitjacket on the expansion of education throughout history.

It would be nice to say that people had conducted research on ways of breaking out of the iron triangle and implemented their most promising findings. That might sound logical but with few exceptions the cart of innovation preceded the horse of research. People implemented new approaches to higher education with the conviction that they would work, but - and this is very important - they then did far more monitoring, evaluation and research on their innovation than was customary in higher education. This allowed them to embark on a systematic process of improvement and refinement of the new model.

I shall illustrate this with reference to the three trends that I mentioned earlier: growth of private, for-profit higher education; the expansion of distance education; and the development of cross-border education.

Private Provision of Higher Education

Private institutions are as old as higher education itself. Much newer is the phenomenon of a company publicly quoted on the stock exchange operating a large university for profit. This phenomenon is epitomised by the University of Phoenix in the USA. In a recent article in *Change: The Magazine of Higher Learning*, Kevin Kinser (Kinser, 2006) stresses that Phoenix is not typical of the traditional for-profit sector in the USA. Unlike most of that sector Phoenix is big, with nearly a quarter of a million students, it continues to expand, it is rich and it is unconventional.

The unconventional nature of Phoenix is what interests us here. It is unconventional not only in comparison to public-sector higher education but also with other for-profit institutions. Fewer than 2% of its 20,000 academic staff are full-time employees, whereas the average in all for-profits in the USA is around half. It also has a centralised curriculum designed by a committee of subject-matter experts and standardised across its 170 locations. It also includes Phoenix Online, an eLearning operation with some 150,000 students, which is the fastest expanding part of the system.

Above all, the University of Phoenix is organised as a system and conducts extensive monitoring and evaluation to enhance its effectiveness and profitability. A decade ago, when other American universities started to take notice of Phoenix as a threat, they tried to attack its credibility from various angles. However, they soon realised that Phoenix was much better equipped than they were themselves to answer almost any question about its operations and effectiveness on the basis of recently collected data. As this realisation dawned criticism became much more muted.

So far Phoenix has had mixed success in its attempts to operate outside the USA but it seems only a matter of time before operations like Phoenix are established in developing countries, especially those with large populations. When that happens there will be pressure on all other higher education institutions in the country to provide data about students' backgrounds, student progression, pass rates, graduate employment and other aspects of institutional impact. There will also be internal pressure within institutions to understand better their cost structures and economics.

Since private for-profit institutions depend on tuition fees for their existence, their multiplication will put the spotlight on fees. Fees are a special problem for those countries that made higher education free--i.e., totally subsidized by the state--in the days when only a tiny proportion of the population was expected to go to university. At that time entry to higher education was highly competitive, but many citizens believed - and still believe - that the combination of competitive entry and free tuition would produce equitable participation in higher education from all socio-economic groups.

A bundant research now shows that this is simply not true. The socio-economic profile of students in countries that charge fees while providing scholarships and loans for poorer students is more broadly based than in those that do not charge fees. This is a very important finding.

Take the case of Mauritius. As is common in many developing countries, there are no fees at the University of Mauritius. However, the government of Mauritius has pulled off the remarkable coup of starting a second public university, the University of Technology of Mauritius, with a fees regime. None of the island's volcanoes erupted in protest, which means that the fees precedent is set for future new universities.

This kind of move is important, because what the public sector does in relation to fees clearly constrains the private sector. Having a free public sector alongside an expensive private sector does not create an effective higher education system. The recent riots at the Shengda Economics, Trade and Management College in China, whose degrees are awarded through the prestigious Zhengzhou University, show the dangers of allowing a free for all to develop with respect to university fees.

Most countries realise they now have to pay attention to fees policy and are gradually introducing fees in the public sector, either because of a conviction that it is more socially equitable or because there is no financial alternative. This puts the private sector on a more level playing field and gives private institutions greater latitude to set fees, which makes them more attractive as investments.

This in turn makes it easier for the private sector to build arrangements for need-based scholarships and loans into their fees regimes. Obviously it takes time to build up enough scholarship funds for admissions policies to be truly blind to student or parental wealth, but if private institutions are to play a major role in the expansion of higher education, they must be able to attract a diversity of people. Only then can they truly claim that private investment in higher education is making its contribution to widening access and that it is thus contributing to the public good.

This is an area where research has been done. The World Bank's International Finance Corporation has carried out the studies necessary to advise companies or governments on how to get the maximum leverage for increasing access to higher education by combining external investment with a fees regime.

Maintaining a focus on widening access is vital and also helps private institutions foster good relations with governments and the public higher education sector, thereby gradually reducing the scepticism of many governments about expanding the private sector. The net result will be that within a decade or two, private, for-profit provision, already estimated at \$350 billion worldwide, is likely to account for a larger proportion of higher education in the developing countries than it now does in the industrialized world.

The Expansion of Distance Education

There are interesting parallels between the expansion of distance education in the public sector in the last thirty years and the emergence of the University of Phoenix in the private sector. Distance learning has a long history which some trace back to Saint Paul's epistles to the young churches of the first century. However, it entered a new phase with the creation of the UK Open University in 1969.

The UKOU was established on the basis of conviction, not as a result of research. Indeed, Walter Perry the founding vice-chancellor (who studied here in Dundee) turned down a suggestion to start the Open University as a small pilot project to see how it would work. He realised that a pilot project would be

condemned to fail because the economics of the Open University rely on scale. He began with a first cohort of 25,000 students. He had the conviction that by using modern communications media and providing personal academic support to students, the effectiveness of university teaching could be transformed and access to higher education dramatically broadened.

So it proved and today, with 200,000 students, the UKOU operates well below the costs of other universities and holds fifth place in national rankings of teaching quality, just above Oxford, my own alma mater. Last year it came first in a national survey of student satisfaction conducted on behalf of the UK government.

These results reflect the brilliance of the initial concept but also the very systematic ongoing research on every aspect of the university's activity that has made it a self-improving system. As well as allowing the Open University to achieve its present eminence this research, in units like the Institute of Educational Technology and the Knowledge Media Institute, has helped higher education worldwide by articulating best practice in the use of traditional and online media.

I would like here to honour the memory of Naomi Sargent Macintosh who died recently. She was the first Pro-Vice-Chancellor for Students at the Open University and began the programme of survey research on students that has served the institution so well.

Cross-Border Higher Education

Another phenomenon, currently rather small in developing countries but destined to grow as their higher education systems expand rapidly, is cross-border education. I refer here not so much to the traditional movement of young people to study in other countries, but to distance education across borders and the creation of branch campuses of foreign institutions. This phenomenon intersects with the trend to for-profit higher education mentioned earlier, because all institutions, whether public or private in their own countries, effectively become for-profit institutions when they teach abroad, since they must operate at a surplus to survive.

Cross-border higher education is now a topic of active research, notably at the Observatory for Cross-Border Higher Education housed at the Association of Commonwealth Universities. However, it also benefits from many years of experience in the development of the regional conventions on the recognition of degrees and awards that are managed by UNESCO. The creation of branch campuses can draw on the financial research of the International Finance Corporation that I mentioned earlier. Where distance learning is involved there is now a wealth of research to draw on from all over the world, since most distance teaching universities have followed the example of the UK Open University in putting much more stress on institutional research than is common in campus universities.

The consequence of all this is that when UNESCO and the OECD elected to develop guidelines for Quality Assurance in Cross-Border Higher Education (UNESCO, 2006) they had could draw on a rich fund of documented research and practice, going back to an earlier initiative to develop guidelines for correspondence education in the 1970s (UNESCO, 1978).

Research on Campus Universities

Having concentrated so far on research in support of newer trends in higher education like for-profit institutions, distance learning, and cross-border operations, let me say a word about research that illuminates the work of campus universities.

Universities increasingly do conduct institutional research, even though much of it is driven by government reporting requirements, the demands of quality assurance and the need to respond to swings in press interest in higher education. Public attention can swing quickly from the fairness of admission processes to the success of graduates in gaining employment to the socio-economic profile of the student body. Universities are wise to track such data so that they have answers if the spotlight falls on them.

There are also of course, researchers who have focussed on systemic issues affecting conventional universities. My favourites are the American researchers Bob Zemsky and William Massy, who have consistently zeroed in on important issues and explored them with great lucidity and a readiness to challenge conventional wisdom. I particularly commend the summaries of their research that have been published in *Change: The Magazine of Higher Education*. This quote gives the flavour of their work:

There is a growing sense that American colleges and universities have become too set in their ways to change. Although their faculties are the principal inventors of the new digital technologies, universities and colleges remain averse to letting information technology change how they provide basic administrative services or deliver instruction. They are also becoming more labour-intensive and more resistant to being judged either by their customers or in terms of their educational efficiency. The writers address the questions of what factors constitute the impediments to change that now make colleges and universities less adaptive and how colleges and universities can preserve themselves as institutions, ensuring that, in their pursuit of success in the marketplace, they neither abandon their academic missions nor settle for a hollowed kind of collegiality. (Zemsky, 1995 (2))

I have particularly appreciated their work on enhancing academic productivity, which shows that considerable economies can be achieved and academic time freed up, with no disadvantage to students, simply by timetabling lectures in a more rational way. I also commend another of their reports, entitled *Thwarted Innovation: What Happened to eLearning and Why*, which caused quite a stir two years ago by pricking the balloon of hype that had been blown up around eLearning.

New Developments to Watch

Open Source Software

Mention of eLearning brings me to my final comments in which I want to bring to your attention some new developments that you should watch.

You are aware of the open source software movement. I see that three-quarters of UK colleges and universities have now adopted open source software to cut their costs. Two-thirds of colleges provide the open source Firefox browser alongside Microsoft Explorer, and with its adoption by the Open University, Moodle the open source course management system for virtual learning environments, will be used by a majority of institutions (Savvas, 2006)

This is something that you should keep an eye on. Decisions on software should not be made on ideological grounds, but neither should they be made out of habit. You need to be in a position to challenge your IT managers and to ensure that they can operate in both proprietary and open source environments and give you rational advice, based on research, about the choices that face you.

Open Educational Resources

I want to end, however by flagging an academic extension of the open source software philosophy, which is the move to open educational resources. Open educational resources are teaching and learning materials that are made available on the web, or in learning object repositories, for everyone to use and share. At COL we believe that this is a very important development, which brings to teaching the culture of sharing and building on each other's work that had always characterised academic research. I pay tribute to the William and Flora Hewlett Foundation for the way that it has encouraged the development of open educational resources, or OERS. Three milestones are notable.

First in 1999 with the help of the Hewlett Foundation, the Massachusetts Institute of Technology (MIT, 1999) began to put the lecture notes of its faculty on the web for general consultation. This commitment to transparency by such a prestigious institution was a wake-up call to the academic community. Other institutions began to follow suit.

We could call MIT's initiative the sharing of curriculum information. The second milestone, which is happening this year, is the sharing of learning. The UK Open University, also with the support of the Hewlett Foundation, is launching an open content initiative that will make available online its self-instructional learning materials and supporting social software. As MIT's Open Courseware was of most interest to academics, the UKOU's Open Content will be of direct interest to students.

The Commonwealth of Learning claims, again with Hewlett's help and with due modesty, that it is creating a third milestone in the development of open educational resources. This is the Virtual University for Small States of the Commonwealth (COL, 2006). It is a network that will allow the 24 small states of the Commonwealth that are involved to jointly develop teaching and learning materials in an electronic format and so that they can be shared and adapted for use in all countries. You might call this the sharing of teaching and learning.

We believe that the movement to open educational resources is potentially enormously empowering, particularly for institutions in developing countries, and we urge you to keep an eye on this too.

The questions that are likely to come your way about OERs will most likely concern copyright, so let me end by giving you a clear steer on that.

Using the Creative Commons

Conventional copyrighting is the antithesis of open educational resources so most people use Creative Commons license, which is designed to promote and protect the freedoms of creative works within the educational commons. The hitch is that a range of "protections" can be applied to the license. One is attribution (BY), which simply means acknowledging the source of the OER. Another is share-alike (SA) which means that if you adapt my OER you must share your adaptation with me in a reciprocal manner.

These two restrictions do not pose problems. The difficulty arises with the non-commercial (NC) restriction which is intended to restrict use to non-commercial activities. Intuitively this non-commercial restriction may seem like a sensible condition to put on the use of OERs developed in the public sector. Unfortunately, however, the non-commercial restriction can have the effect of closing open educational resources to just the type of use that the originators would like to see, especially in developing countries. It does this in two main ways.

First, it may prevent the distribution of free content to people who need it most. For example the non-commercial restriction would not legally permit another university to package a print version of your online OER for resale at a price to cover printing, packaging and overheads.

Second, and even more serious, the Non-Commercial license is incompatible with other free content projects. You cannot mix material with a free content license with material that has a Creative Commons license with the NC restriction. If your project uses a NC restriction you cannot use any of the images, sound files or video files of the Wikicommons project which now has more than 600 000 free content resources.

What is the risk of dropping the NC restriction? It is highly unlikely that an entrepreneur will be able to make a substantial profit from an OER, simply because the original version of the OER will remain open. Why would you pay good money for a commercial version of open content, when you can get the original version for nothing?

Even the low risk of commercial exploitation is better addressed by the "share-alike" protection, which means that any published revisions and derivative works must always be released with a share-alike protection, which ensuring the future freedom of the resource by encouraging community participation - since all contributions will remain within the commons.

This all sounds very arcane but it is just the kind of thing you should be aware of. If people regularly place non-commercial restrictions on open educational resources the latest miracle of educational technology will not be able to work its wonders in creating a global intellectual commons. Open educational resources will not be open.

Conclusion

That is a good place for me to end. Your task as senior university leaders is to uphold the academic ideal as you guide your universities through a period of growth and change. In the rest of this meeting, as you consider how to foster science and innovation on your campuses, I urge you to reflect on the scientific basis of change in the university itself, to remember that paradigms are changing and, as Thomas Kuhn reminds us, 'when paradigms change, the world itself changes with them'.

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