

Technology in Higher Education: How to Avoid Failure and Achieve Success



Centre for Educational Communications - University Grants Commission

Technology Enabled Blended Higher Educations: Visioning of University of 21st Century

*Seminar held in New Delhi, India
20 September 2006*

*Sir John Daniel
Commonwealth of Learning*

Introduction

It is a pleasure to be here with you. The Commonwealth of Learning (COL) is proud of its many links with the University Grants Commission. In the early 1990s Professor Ram Reddy, who was then Vice-President of COL, was appointed Chairman of the UGC. More recently, during Professor Arun Nigavekar's Chairmanship, we have organized some productive events together. It is a great pleasure to meet the new Chairman, Dr Sukhdev Thorat at this event.

COL much admires the work of the Centre for Educational Communications, with which we have worked since 2003 by bringing in experts to support the Annual National Convention. This year we shared expertise on adapting learning content to different learning styles. We are delighted at the prospect of relocating CEMCA, our Commonwealth Educational Media Centre for Asia alongside the CEC in the new phase of building.

Thank you for inviting me to address this seminar on Technology Enabled Blended Higher Educations: Visioning of University of 21st Century. That title is quite a mouthful. What I propose to do is to start with the vision of the university of the 21st century and then ask what technology can contribute to the attainment of that vision. Your seminar title talks about 'Higher Educations' in the plural, which is wise given the growing diversity of provision that we are likely to see.

I shall focus exclusively on what technology can do for the teaching function of the university and ignore the role of technology in the research function. Technology is playing a huge role in advancing research,

not least by making it possible for research teams to function with their members in different parts of the world. However, it is my observation that researchers adopt useful technologies spontaneously, which is not the case for teaching.

My title, rather ambitious perhaps, is *Technology in Higher Education: How to avoid Failure and achieve Success*. That requires that I begin by outlining some criteria by which we can measure success, which takes us back to visioning the university of the 21st century.

The University of the 21st Century

The fundamental fact about the university of the 21st century is that it will be largely defined by countries like yours. In the first millennium Arab universities played the key role in the advancement and transmission of knowledge. In the second millennium the leadership passed to Europe and, at the end of that millennium, to North America. It would be pretentious to make forecasts for the whole of the third millennium, but in this first century of that millennium the profile of higher education will be defined by its growth in the developing world - India and China in particular.

For two decades, worldwide enrolment growth in higher education has exceeded the most optimistic forecasts. A milestone of 100 million enrolments was passed some years ago, and an earlier forecast of 120 million students by 2020 looks likely to be reached by 2010. Growth is, if anything, accelerating as more governments see the rapid expansion of higher education as a key element in their transition from a developing to a developed country.

India made a statement to that effect just a week ago in announcing consultation on a policy on Cross-Border Higher Education. This is also the situation in China, where enrolments doubled between 2000 and 2003 so that today, with 21 million students, China has comfortably overtaken the US as the world's largest higher education system. Malaysia also illustrates the trend. It plans to increase enrolments in higher education by 166 percent in the next six years, from 600,000 to 1.6 million, in order to achieve developed-nation participation rates. Mauritius has recently passed legislation to create a third university for its 1.2 million people, having added its second university only five years ago.

Growth has been rapid in other developing countries as well - but usually from a very low base. There is a massive disparity in the higher education participation rates of students in the 18-23 age group (known as Age Participation Rates, or APRs) across the world. APRs of around 50 percent are now the norm in developed countries, whereas in South Asia, as here in India, and Sub-Saharan Africa they languish below 10 percent.

Even here in India, where you are impressively practiced in talking large numbers, I imagine that you have difficulty grasping the implications of moving from an APR of less than 10% to an APR of 40%. How do you imagine a system four times as large as what you have now? You must imagine it, because that is the coming reality. 60% of your population is under 25 years old, so demographic decline will not alleviate the challenge for you as it will for China.

The Challenges of Access, Cost and Quality

What is the challenge? It has three vectors which I like to put together as a triangle. Some Indian colleagues call this the Daniel triangle but since there is nothing original about it I prefer to call it the Iron Triangle.

It is a triangle defined by the vectors of access, cost and quality because you can summarise the challenge to higher education - and to education generally - by those vectors. First you must increase access to the higher education - a 400% increase in numbers speaks for itself. Second, you want to do this at low cost. Even with 8% annual economic growth, which will solve a multitude of development problems, you will not be able to throw unlimited money at higher education. And nor should you!

I define quality as fitness for purpose at minimum cost to society and the second part of that definition is important. You owe it to your fellow citizens not to allocate more of their public funds to higher education than you really need to build a quality system.

Third - and I have just touched on it - you want quality. That goes without saying. But too often, of course, it goes without doing as well. So we must be explicit about quality.

So far, so good - but why do I call this the iron triangle? I call it the iron triangle because it has been a straitjacket on educational development and expansion throughout history.

Hundreds, indeed thousands of years ago humankind developed a simple form of instruction where someone stands in front of a group of people and talks to them. Later, when books were invented, the lecturer was able to read to them as well as talk to them, but the essential model remained the same.

The essence of the model is that the teacher conducts all five steps of the instructional process: she plans the lesson; prepares any learning materials required; gives the lesson or lecture to the students; assesses what the students have learned; and reviews the whole process before going through the cycle again.

This simple process has one great virtue, one mixed virtue and one great vice. The great virtue is that it is flexible. You can teach a group under a tree in an African village or in the most modern lecture theatre in Singapore. The mixed virtue is that it gives profile to the individual teacher. This is good if the teacher is good but bad if the teacher is bad. We have all experienced both. That is why it is a mixed virtue. The great vice of this model is that it is expensive and not scaleable.

Think of it in terms of my iron triangle. You can increase access by putting more learners in front of the teacher, but quality will go down once the teacher has too many students to assess properly. If the teacher provides more and better learning materials the cost will go up. With this model you cannot improve one side of the triangle without deterioration on the two other sides.

This has been the bugbear of education throughout history. Whether we admit it or not, it has created in all our minds a link - an insidious link - between quality and exclusivity. We assume that we cannot

achieve quality education without excluding many people from it.

This problem is not unique to education. The link between quality and exclusivity was the norm in most fields of human activity until two hundred years ago. Nearly all products and services were provided by individual artisans, exactly like the model for teaching I just described.

But in those other fields of human activity life changed with the industrial revolution. The great economist and moral philosopher Adam Smith, in his classic *The Wealth of Nations*, described the difference between producing pins in an artisan's workshop and producing them in a factory. The factory-made pins are cheaper and their quality is more consistent. The industrial revolution brought a range of technologies into the production of goods and the delivery of services.

The Essence of Technology

However, the two most important technologies, which today you may not even think of as technologies, are specialisation and division of labour. The essence of the industrial revolution was to split the production process into its component parts and have different people or machines specialise in doing each of them as cost-effectively as possible. The result is economies of scale.

This is the essence of technology and this is the essence of technology in higher education. Can we bring the same principles of specialisation and division of labour to bear on university teaching? Can we achieve economies of scale?

The industrial revolution was highly competitive. Many individuals and companies seized on these simple principles to produce new goods and services and to produce goods and services in new ways. There was an effervescence of innovation. The effect was to break out of the iron triangle and make goods and services more accessible, less costly and of higher quality. The possibilities of technology will create a similar effervescence of innovation in higher education. Indeed, it is already beginning. The profiles of higher education providers are already changing.

Two developments - and a third that brings the two together - are particularly important. First there is the growth of private, for-profit providers. Second there is the growth of distance education. The combination that brings the two together is cross-border higher education.

Higher Education Providers - A Changing Profile

India has a very long tradition of private provision of tertiary education - indeed most of your technical education is delivered by private institutions. You also have a strong tradition of distance learning, although primarily in the public sector through your various open universities and through the many dual-mode universities that offer correspondence courses of variable quality alongside their campus offerings.

One of the questions that I put on the table, but will not answer explicitly, is whether the private sector or the public sector is better equipped to innovate successfully in applying technology to higher education.

An extension of this question is whether the public sector or the private sector is more likely to achieve long-term success in cross-border education. Here I mean cross-border education going out of India as well as cross-border education coming in. You already have some significant players exporting Indian higher education across borders. In the private sector I think of NIIT, the National Institute for Information Technology. In the public sector IGNOU, the Indira Gandhi National Open University, is teaching in various countries overseas.

I shall not expand at further length on the changing profiles of higher education providers. As India grows from a 10% age participation rate to a 40% age participation rate you will have some vigorous debates about the role of private institutions and private, for-profit institutions - is there really a difference? Government's policy is to expand the proportion of distance learning in the Indian system to 40% within a few years, although that will not be achieved on present trends. A debate is just beginning about policies on cross-border education which will be exciting. I just hope that it includes India's exports as well as its imports.

All these will be interesting debates. Not for nothing did Amartya Sen entitle a recent book *The Argumentative Indian*. I will be fascinated to see how Nehruvian, liberal, conservative and Marxist views clash in these debates but I am not going to open them here.

Changing Technology

For the rest of these remarks I shall focus on the technology, not the organisational setting in which it is used. You can judge for yourselves which types of organisational settings are likely to be most successful.

It is fashionable to distinguish between different generations in the application of technology to education, especially to distance education. I find that unhelpful for two reasons. First, I have difficulty remembering which generation is meant to be which, especially as we are now at number five or six - I can't remember which! Second, and more importantly, the term generations implies that one set of technologies succeeds another. But this is not what happens. New technologies simply add themselves to the older ones, making a richer and richer mixture to work with. Evolution, not revolution is the name of the game.

Some fanatics claim, of course, that their latest technology is the magic medium that will solve all educational problems. But history shows us clearly that there is no magic medium and never will be. The most recent example was the dotcom frenzy of the year 2000. Various people tried to start organisations that would teach purely online because that was the magic medium. In the space of two years these organisations either went broke and closed, or blended other technologies, such as books, into their teaching strategies. Indeed, I would argue that the book is still the closest thing we have to a magic medium for education.

Rather than promoting a particular medium we must look at all the technologies available in the light of what we are trying to achieve and then make a judicious selection. Obviously this cannot be an entirely abstract process because the technologies available will differ from one place to another. But this does not

matter because there is a lot of redundancy between technologies, meaning that many are interchangeable.

I shall use my iron triangle as a point of reference and start with that old technological stand-by: print. The essential features of print are economies of scale and consistency of quality. If you think of print as a teaching medium it can enhance access because you can make as many copies as you like. The more you make the cheaper each one becomes, so you cut the cost. Print gives consistency of quality and if you are going to print large numbers of copies it makes sense to make the initial investment necessary to ensure that the document is of good quality.

Economies of Scale

The success of what people call the first generation of technology-enhanced learning was based on the economies of scale of print. But notice that many subsequent media also generate economies of scale. Indeed, as a rough generalisation each new medium generates greater economies of scale than the previous one. Once you broadcast a TV or radio programme adding a further viewer or listener costs almost nothing.

Furthermore, making these programmes portable also costs little. You can put a huge amount of text, audio-visual material and software on a DVD and that costs very little to reproduce. It also costs very little to send the contents of that DVD through the Internet to lots of people - or to put it on the Web so they can access it themselves. This assumes, of course, that people have access to a networked computer. That is not a valid assumption for most Indians today, but before long it will be.

So technological media, from print onwards, allow us to achieve economies of scale in reaching people with part of an educational experience. I must now focus on that word 'part'.

Independence and Interaction

Reading a book or watching a TV programme is instructive, but by itself it is not education. Education implies a relationship with an institution that attests to what you have learned and usually helps you with your learning along the way.

I summarise this by observing that learning has both independent and interactive components. I've mentioned the independent components already. They are the major component of our learning, especially as we progress into higher education.

But most students need more than this to learn and all students need more than this if their learning is to be certified. That brings us to the interactive component of learning. I define interaction rather strictly. Some people might call working at a computer interactive because things happen when you hit the keys. But if you and I hit the same sequence of keys and the same thing happens I do not call that interaction. I use interaction to mean getting a response that is specific to me. The best way of ensuring such a response is still through the involvement of other human beings.

So any technology-enhanced learning system of integrity will include arrangements for interaction between students and tutors or teachers. At the very least this means an assessment at the end of the course but it should mean much more than that, most especially the formative assessment of assignments during the course. One of the most effective aids to learning is to have someone comment on your attempts to demonstrate what you have learned through exercises or an essay. And I mean constructive and helpful commentary, not just ticks in the margin.

This is why serious distance education systems take pains to provide tutors to review students' work. Good distance education systems will provide more interaction than that, such as occasional meetings between students, who are often very good at tutoring each other.

Needless to say, providing good opportunities for interactive learning is more complicated and more expensive than providing materials for independent learning. However, the successful open universities have achieved this and the UK Open University, for example, ranks fifth for teaching quality and has been in top place for student satisfaction two years running.

The good news is that newer technology is helping here too. In the old correspondence system the time taken for student assignments to go through the mail to the tutor and back again was a serious problem in countries with poor mail services. Combinations of e-mail and answers to frequently-asked questions on a website are allowing institutions to give much faster feedback - and there is a strong correlation between rapidity of feedback and student motivation.

But technology cannot replace human beings and the main challenge in building a good technology-enhanced learning system is not technology but human organisation. I regret to say that COL has been witness to distance education courses coming out of India where the human organisation around the programme is so bad that students are left without feedback for months on end. I know that in India the numbers are such that some institutions feel they can limit themselves to offering independent study only. But this is not distance education and if Indian institutions want to be credible players in cross-border education they will need to get their act together.

The Big-Small Paradox

You may have noticed a paradox in what I have been saying. Independent learning favours the big institutions because it is based on economies of scale. I think particularly of the twenty open universities around the world that have the status of mega-universities because they each have over 100,000 students enrolled. But the bigger the institution the bigger the organisational challenge of running an effective tutorial system.

Smaller institutions should find it much easier to provide effective interactive support to students but they lack the economies of scale that justify serious investment in preparing independent learning materials.

The obvious answer, of course, is for smaller institutions to acquire learning materials from the bigger ones and concentrate on providing good support to learners. COL has been promoting this approach for

years and we are having increasing success. One example is the Commonwealth Executive MBA and MPA programmes that were developed jointly by the four national open universities of South Asia. These are now being used in Malaysia and Nigeria with expressions of interest from Papua New Guinea and the West Indies.

In general, however, this type of sharing has been slow to take off. There are a number of reasons why. One is the 'not-invented here syndrome'. For a long time academics felt it was reprehensible to build on another person's work in teaching - although they took such behaviour for granted in research. A second was the sheer difficulty of adapting materials that were not in digital formats - and some adaptation is always needed when you move materials from one institution to another.

Fortunately technology has come to the rescue here too. First, the whole new world of Google and Wikipedia has completely changed the psychology of using another's materials. If I want a map of India for a slide I don't start drawing one. I go to Google and enter 'Wikipedia Map India' and find a choice of several that I can use without copyright worries.

Second, learning materials can now be shared digitally as open content and adapted for onward use. This is a vitally important development with which both the CEC and COL are resolutely engaged. I shall end with this and make several points.

First, I pay tribute to the Massachusetts Institute of Technology, MIT, for giving a huge boost to the open content movement by putting its instructors' lecture notes on the Web from 2002 onwards. For such a prestigious institution to make its curriculum information generally available changed the psychology of sharing. This movement is gathering momentum and evolving as it does so.

Second, the CEC itself is also developing digital learning objects as open content and has trained many teachers to produce and use them. EDUSAT is now being used to extend and scale up this training around the country.

Third, this year the UK Open University is going beyond sharing curriculum information and making available its self-instructional materials along with various bits of social software that it has developed to foster interactive learning. You could call this the sharing of learning.

Finally, at COL we are now engaged in sharing both teaching and learning through a unique project, the Virtual University for Small States of the Commonwealth (VUSSC).

Two-thirds of the Member States of the Commonwealth, some 32 countries, are small states most with populations of less than one million. Six years ago their Ministers of Education, fearful that their countries did not have the critical mass to develop technology-enabled blended higher education, asked COL to help them work collaboratively so as to achieve collectively the critical mass that they could not reach individually. We are building the VUSSC from the bottom up.

Last month it passed a vital milestone as 12 countries got together in Mauritius and spent three weeks

developing materials for tertiary-level courses in Tourism and Small Business Management. This was done on a Wiki, in full view of anyone on the Web who cared to look in. You can watch it happen at our WikiEducator site: [www.WikiEducator.org]

Now the work will continue and very soon other groups of small states will begin developing materials in other areas relevant to the professional development of their citizens. We have coined the term 'criss-cross border higher education' for this process of give and take, of sharing and adapting, that the technology of open educational resources makes possible.

These courses are being developed collaboratively and transnationally as open educational resources under a Share-Alike Creative Commons licence. This means that anyone can use the materials and adapt them to their own purposes provided that they acknowledge the source and put their own adapted materials back into the system.

Note that we have NOT applied the 'Non-Commercial' restriction because we believe that it would prevent the use of these open educational resources by just those countries and institutions that can benefit most from them. COL strongly discourages all who believe in open content from imposing the 'Non-Commercial' restriction because it makes open content much less open - and also less rich, because it precludes you from incorporating any of the 600,000 free content resources in the Wikicommons project.

The Virtual University for Small States of the Commonwealth is an almost utopian example of how countries can work across borders to create content which is available free of cost to all partners and which will be used and shared across different institutions. There will be mechanisms for joint delivery and credentialing as well as recognition of degrees and transfer of credits.

Conclusion

It is time to conclude. My title was Technology in Higher Education: How to avoid failure and achieve success. What have I tried to say?

First, you should focus on education not technology. No magic medium will solve the challenge of teaching. Concentrate on building a learning system.

Second, remember that learning happens both independently and interactively. Work hard at the interactive part because it is more difficult and ultimately more important.

Third, the open content movement makes it easier for you to focus on the interactive side of learning and support to the student because you can now adapt and adopt a growing body of good learning material.

As the world's largest democracy India will play a huge role in higher education in this century and will likely become the major cross-border provider. I urge you to take that responsibility seriously by keeping the learner always in mind and supporting the open content movement as the CEC is already doing so well.