Running Distance Education at Scale: Open Universities, Open Schools and MOOCs

Abstract

Distance learning accelerated and diversified during the covid-19 pandemic, with the result that individual teachers working with their normal classroom groups now account for most of the courses offered online. However, this provision of 'closed distance learning' will not suffice for the needs of the hundreds of millions of people who will seek secondary schooling, degree studies and continuing education in the next 20 years. We describe how open distance learning can be conducted at scale through open universities, open schools and MOOCs, which are all designed to cope with mass demand. Our focus is on how these organisations are run. This embraces institutional design and organisation, governance, management and administration, and leadership. The three types of providers have various corporate and governance structures: public open universities; open schools under the aegis of government; and commercial MOOCs companies. However, the challenges of management and administration, which are to sustain operations at scale around the clock worldwide, are rather similar. Their leadership requires a genuine commitment to serving the disadvantaged, an ability to secure the trust of governments, understanding of the opportunities that emerging technology offers for distance education and thorough familiarity with the institutional dynamics of open and distance teaching and learning systems.

Keywords: open universities; open schools, MOOCs, SDGs, scale, management, logistics, leadership.

Introduction: distance education diversifies

Distance education facilitates access to successful study. It has the potential to teach at scale and reach large numbers of learners. Since the middle of the 19th century, various developments, notably postal services, radio/television broadcasting, and the internet, have brought opportunities for distance learning to more and more people.

During the 2020-21 covid-19 pandemic, most schools and universities, few of which had experience of distance education, closed their campuses and attempted to teach their pupils and students at home. But, although this emergency switch to remote teaching required school and university staff to adapt their skills and adopt new practices, they did not have to scale up their teaching and be open to more diverse learners. Emergency remote teaching was, in effect, closed distance learning.

Most schools opted for a return to classroom teaching after the pandemic. Their experience of covid-19, when some governments closed classrooms for many months, had shown that remote teaching was ineffective for school education. With 90% of pupils out of school during the pandemic, decades of educational progress had been reversed (United Nations, 2021). Moreover, inequalities of learning achievement, within and among countries, were further exacerbated (Daniel, 2020; Kanwar & Daniel, 2020). Long before the pandemic, however, some developing countries had established open schools to offer secondary schooling to children not reached by

the conventional school systems (Daniel, 2010, pp. 110-140). Open schools could play a major role in repairing the damage of the pandemic.

Post-compulsory institutions offering higher and continuing education rode out covid-19 more successfully. They coped remarkably well with the transition to emergency remote teaching and, since these institutions are relatively autonomous, they adopted a variety of practices. In 2020, most instructors used video technologies (e.g. Zoom) to teach their home-based students live, but in 2021 some began experimenting with asynchronous coursework. Gauging overall student reaction to remote teaching was difficult, because some surveys were slanted to confirm researchers' biases (see e.g. Bates, 2021). Nevertheless, student attitudes were sufficiently positive for institutions to continue some use of digital distance learning methods when teaching mostly returned to the classroom in 2022. Practices now vary widely. Some institutions mandate the same combinations of distance and classroom teaching for all students in a group, while others offer a 'hyperflex' choice of experience.

In sum, covid-19 accelerated the diversification and expansion of distance education that had been under way since post-compulsory institutions first began to take advantage of the internet in the 2000s. Prior to the pandemic, for example, 10% of all courses from Canada's campus institutions were taken online. Nevertheless, within the current diversity of offerings there remain two broad categories of practice: closed digital distance teaching by individual instructors to campus-sized classes; and open distance education at scale by institutions designed to reach much larger groups.

Why conduct distance education at scale?

Here we shall focus on distance education at scale. This requires teaching and learning systems that are radically different from the congeries of practices in classroom-based institutions post covid-19. However, given the wider availability of distance learning at all levels following the pandemic, we must first ask whether specialized institutions that conduct distance education at scale are still needed.

Distance education at scale is necessary because growing numbers people worldwide, numbering in the hundreds of millions, have no access to the education and training that might help them lead more fulfilling lives. We examine three areas of need: post-secondary education; secondary schooling for the hard to reach; and new skills and knowledge for coping with the post-pandemic world.

Goal 4 of the UN's Sustainable Development Goals (SDGs) for 2030 embraces all three areas. It states: 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (United Nations, 2015). It includes seven targets -- we note two in particular:

4.1 Ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.3 Ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.

Each of these targets covers hundreds of millions of people.

Target 4.1 continues, and extends to the secondary level, the global campaign for universal primary education that was launched in 1990 and given fresh impetus at the World Forum on Education for All (EFA) in Dakar, Senegal in 2000. Some targets from that Forum were incorporated into the UN's Millennium Development Goals (MDGs), leading UNESCO, UNICEF, the World Bank and national development agencies to coordinate their efforts to get all children into primary school by 2015. These efforts achieved some success (UNESCO, 2016). Primary school net enrolment rose from 84% in 1999 to 93% in 2015, but progress then stalled, with 58 million children still not in school and 100 million not completing their primary studies. Covid-19 exacerbated existing inequalities. In low-income countries only 34% of children from the poorest fifth of households complete school, compared to 79% from the richest fifth.

The primary education campaign revealed, however, that universal secondary education would be a much more challenging goal. A 2006 estimate indicated that nearly 400 million children in developing countries between the ages of 12 and 17 did not attend secondary school (Binder, 2006, p. 35), a figure that remained at 258 million in 2019 (UNESCO, 2019, p. 1). Secondary schooling is more costly than primary schooling. Indeed, Lewin (2008) found that a country is very unlikely to achieve universal secondary schooling if the unit cost of secondary is more than twice that of primary. In sub-Saharan Africa the disparity is usually much larger, with ratios of secondary to primary costs commonly between 3:1 and 6:1 (Lewin, 2008, p.66).

In sum, schooling remains a huge challenge. The UN estimates that in 2030 over 200 million children will still be out of school (United Nations, 2021). We shall examine later how open schools operating at scale can help to address this challenge, as well increasing the 'number of youth and adults who have relevant skills...for employment, decent jobs and entrepreneurship', which is another Goal 4 target.

Target 4.3 is about access to tertiary education, which was absent from the MDGs. Its inclusion in the SDGs reflects governments' increasing understanding of the contribution of tertiary education to economic and social development. With larger numbers completing secondary school and societies becoming more complex, demand for tertiary education has grown steadily. Official estimates of future demand for tertiary education have usually proved to be gross underestimates. Nearly 30 years ago, in *Mega-Universities*, the present author wrote: 'population growth is outpacing the world's capacity to give people access to universities. A sizeable new university would now be needed every week merely to sustain current participation rates in higher education. New institutions are not being created at this frequency. A crisis of access lies ahead' (Daniel, 1996, p. 4).

In this century the demand for tertiary education has accelerated. Calderon (2018) predicts that global enrolments will grow from 250m in 2020 to nearly 600m in 2040. This assumes that

enrolment ratios worldwide will rise from 2,700 per 100,000 population to 6,500. Moser & Ortiz-Ospina (2013) reach similar conclusions. Participation rates will grow everywhere, with the share of the 15+ population educated to degree level reaching around 50% in countries such as Canada, Finland, Singapore and South Korea by 2050. Although these projections were made before covid-19, its fall-out seems likely to increase demand further. However rapidly campus institutions grow in response, it seems inevitable that distance learning at scale will be a large part of the solution, not least because the global response to climate change will favour education systems that are less carbon intensive.

SDG Target 4.3 also includes post-compulsory continuing education. In this context we shall examine MOOCs (Massive Open Online Courses), which are a 21st century example of conducting distance education at scale for a global audience. The number of MOOC learners worldwide was estimated at 180 million in 2020 (Class Central, 2020). They were studying some 16,000 MOOCs offered by nearly 1,000 universities. One-third of all learners who ever registered on a MOOC platform did so in 2020, which was evidence of a pandemic-induced surge of interest in free online learning. The UK Open University saw the number of visitors to its OpenLearn website of 1,000 free courses jump from 8.9 to 13.6 million between 2019 and 2020. Surveys showed that one in seven UK adults started an online course during the pandemic (Blackman, 2020).

The pandemic has further stimulated an appetite for learning that was already widespread. Accessible opportunities for learning at a distance should be part of the global response. Here we examine the operational challenges of three types of distance education at scale: open universities, open schools, and MOOCs. Our focus, summarized as 'running distance learning at scale', is on three areas: institutional design and organisation; governance, management and administration; and leadership. Issues of curriculum, pedagogy, technology and student support will be subsumed under those areas. We start by recalling the development of distance education, looking at the emergence of open universities, the concept of open schools, and the genesis of MOOCs.

The introduction of postal services led to education by correspondence in the mid-19th century. This was offered mainly by commercial enterprises until the mid-20th century, although some public school systems (e.g. France, British Columbia) and post-compulsory institutions (e.g. London University) offered some correspondence courses alongside their classroom programmes.

Open Universities

Awareness of distance education expanded dramatically with the creation of the UK Open University (UKOU) in the 1960s. The slogan articulated at its foundation, 'open to people; open to places; open to methods; open to ideas' (Crowther, 1969), captured its high aspirations. For as well as teaching at a distance and being 'open to places', the UKOU declared that it was 'open to people' by removing all academic prerequisites for enrolment. The basis for admission was 'first come, first served', up to the capacity that the institution could cope with.

In the inaugural address the statement 'open to methods' also reinforced the expansion of access, because broadcasting on the BBC's public radio and television channels was part of the UKOU's multi-media teaching strategy. For Harold Wilson, the UK prime minister who launched the idea of an Open University, which he first called the 'University of the Air', openness and access was symbolized by enabling the general public to join students in watching the university teach. The UKOU was formally launched in the week of the first moon landing in 1969. It first chancellor exhorted it to be 'open to ideas' with these words: 'What a happy chance it is that we start on this task in this very week when the Universe has opened! The word has a new meaning henceforward. The limits, not only of explorable space, but of human understanding, are infinitely wider than we have believed,' (Crowther, 1969).

These lofty ambitions required the invention of new ways to offer tertiary education at scale, for scale was essential to the UKOU's success. In his entertaining account of its creation, the founding vice-chancellor, Walter Perry, records how the university stood firm on its intention to admit a first cohort of 25,000 students, despite pressure from the UK's cautious minister of finance to begin with a pilot project of only 5,000. During its planning phase the UKOU had faced widespread scepticism, even downright hostility, in the press and the rest of tertiary education. Perry referred to 'our overwhelming desire to achieve economy of scale. We felt that if our costs per student were as high as those of other universities we would be very vulnerable' (Perry, 1977, p.139).

Scale was an asset in many ways. In its second year of operation, with 40,000 students, the UKOU became the country's largest university. By broadcasting TV and radio programmes into the nation's homes it became a household word - and the butt of friendly jokes! Above all, the enthusiasm of the student body made the project politically unstoppable. Many early students were school teachers eager to convert their diplomas into degrees. Their high completion rates soon yielded large numbers of UKOU graduates who talked up, throughout the education system, the opportunity it offered. Within 30 years enrolments had risen to 200,000 and when the British referred to 'OU' they meant the Open University, not Oxford University!

In the following decades concept was widely imitated. The term 'open and distance learning' (ODL) began to replace 'distance education'. By 2010 some 50 tertiary education institutions around the world were called 'open universities' (Daniel, 1996, 2019; Mishra, 2017). All were designed to operate at scale and, even in low-population jurisdictions, they adopted the scalable organisational arrangements that we shall describe.

Open Schools

It was natural that India, which had struggled to give all children primary education, let alone access to secondary schools, should pioneer a different approach. India's gross secondary school enrolment reached 50% in 2005, rose to 75% by 2014, but then stalled (GlobalEconomy.com, 2021). The Central Advisory Board for Education suggested that 15% of the secondary population be served by open schooling. India had established a National Open School as an autonomous organisation in 1989. Renamed the National Institute for Open Schooling (NIOS) in

2002, it became an apex body for distance learning with responsibility for facilitating the development of a network of state open schools (Daniel, 2010: pp. 116-122).

The NIOS is very successful. It has 2.2 million pupils enrolled and admits 350,000 annually. However, the situation of the state open schools is more patchy. In his study of their development Rajagopalan wrote:
'Taking an overall view, one cannot escape the conclusion that with very few exceptions, the State Open Schools resemble atrophied limbs of the State Education Department. They are like rudderless ships set adrift in a sea of low morale. This is a poignant situation when one considers the immense potential of SOSs to bring about a sea-change in the social set-up and improve the economic well-being of the underprivileged people' (Rajagopalan, 2011, p. 4).

Earlier, the same author had reviewed the development of India's state open universities and concluded: 'The State Open Universities in India reveal a picture of diversified growth. The first state OU, established in 1982 in Andhra Pradesh, started off well with many programmes and dynamic leadership during the first few years. Unfortunately, however, a situation of complacency and bureaucratic control has dominated the scene in the recent past' (Rajagopalan, 2007).

Rajagopalan's conclusions highlight an important challenge. Large-scale distance education operations are not easy to establish and run. Visionary and energetic leadership is needed to launch them, while their implementation and maintenance depends on first-rate management, efficient administration and determined commitment to students, most of whom have more difficult lives than those able to go to school. The creation of distance education institutions intended to serve large underprivileged populations by top-down administrative fiat is not a route to success.

Massive Open Online Courses

MOOCs are our third manifestation of large-scale distance education. Around 2010, some university computing academics seized on the internet to attempt computer-based teaching across the globe (Daniel, 2012). It recalled the moment in the mid-19th century when the inventor of Shorthand, Isaac Pitman, decided to teach his new language by correspondence using the newly created postal service.

Although universities use information technology extensively, they realized that to offer MOOCs they would need outside help to maintain computer-based teaching systems that could operate worldwide, 24/7, with very large enrolments. New organisations, such as Coursera (USA) and FutureLearn (UK) were created for this purpose.

As enthusiasm for MOOCs burgeoned, the initiating universities realized that they could not satisfy the demand by relying solely on their own academics, some of whom were sceptical of MOOCs anyway. They invited other universities to join the enterprise, suggesting that offering short courses to large global audiences would be an attractive way to enhance their brand, even if the economics of the MOOCs themselves were - and still are - uncertain. A definition of a

MOOCs is: 'a course of study made available over the Internet without charge to a very large number of people: anyone who decides to take a MOOC simply logs on to the website and signs up' (Oxford Dictionaries Online, 2021). This definition highlights the 'easy-come-easy-go' nature of MOOCs. Nevertheless, although completion rates are usually dismal, the huge worldwide enrolments in MOOCs indicate that they are a useful part of the open distance learning ecosystem.

As more players jumped on the bandwagon the definition of each word in the acronym MOOC lost precision, as nicely captured in a famous poster by Mathieu Plourde (2013) of Laval University. Our analysis of MOOCs will focus on FutureLearn, which was formed as a for-profit entity by the UK Open University in 2012, with the Australian employment marketplace company SEEK, becoming a 50/50 joint owner in 2019. By 2021 FutureLearn counted 250 partner organisations and over 10 million registered users (FutureLearn, 2019).

Building on this background, we explore the challenges of running distance education at scale under three headings: institutional design and organisation; governance, management and administration; and leadership.

Institutional Design and Organisation

Despite the different organisational arrangements required for open universities, open schools and MOOC providers, they have the common feature of serving a mass clientele. Adam Smith, the 18th century economist and moral philosopher, pioneered modern thinking about designing for mass demand. In his classic, *An Inquiry into the Nature and Causes of the Wealth of Nations,* he described how the industrial revolution scaled up manufacturing. Taking the example of a pin factory, an early manifestation of the transition from cottage industries to mass production, he summed up the radical changes as follows:

'*This great increase of the quantity of work which, in consequence of the division of labour, the same number of people are capable of performing, is owing to three different circumstances; first, to the increase of dexterity in every particular workman; secondly, to the saving of the time which is commonly lost in passing from one species of work to another; and lastly, to the invention of a great number of machines which facilitate and abridge labour, and enable one man to do the work of many....'* (Smith, 1776).

The analogies to the provision of education at scale are clear. The 'dexterity of every particular workman', translates to the creation of teaching systems that integrate a range of specialized functions in an effective manner. 'The saving of time...lost in passing from one species of work to another', means that the various specialists and partners can make their inputs at different times, which speeds up the overall process. Lastly, contemporary information and communications technologies provide us with 'a great number of machines' to facilitate the tasks of both teaching and learning.

These parallels led the German scholar-practitioner, Otto Peters, to describe distance education as an 'industrial form of education' (Keegan, 1994). However, his work began to be cited in the

1990s, as the world entered a post-industrial era. For some, the industrial or 'Fordist' era recalled faceless drones on soulless assembly lines, whereas the idealists of open and distance learning saw themselves as the dynamic pioneers of a new era of education. This provoked a robust debate in the scholarly literature about Fordist and post-Fordist approaches. An article by Raggatt (1993), 'Post-Fordism and Distance Education: a flexible strategy for change', was an example.

Comparing the course development and production methods used in distance education at scale to Model T Ford assembly lines may seem far-fetched, but authors like Raggatt had a point. The 1990s was a period of significant curriculum change in all areas of education. For some topics it was no longer appropriate for large course teams to take many months to develop standardized distance learning materials and offer them for years with only minor revisions. More flexible approaches were needed to allow quick updates. Fortunately, making these in online courses was easier and cheaper than reprinting materials.

Nevertheless, division of labour, standardisation and partnerships are core strategies for distance education at scale. Open universities now offer shorter courses and develop them more quickly. Open schools closely track their countries' developing curricula and can rapidly offer newer areas such as vocational education (Daniel, 2010, p. 118). Their economies of scale are increasingly impressive. The cost per pupil of India's NIOS was less than one-twelfth of those at conventional schools (Rumble & Koul, 2007, p. 128).

For MOOC platforms division of labour means having their partners' organisations develop the courses following centrally-established guidelines for format and quality. This author has taken 20 MOOCs (from 12 partner institutions) of the 2,500 courses that FutureLearn has offered. A common format makes navigations of the courses easy, while allowing the character of each partner institution and the strengths of its academics to shine through. FutureLearn's social learning platform has attracted 35 million inputs.

These scale providers have remarkably lean core operations. India's NIOS has a central staff of 250 for over 2 million pupils. The tutors and mentors who support the pupils work in 11 regional centres and 3,260 study centres located in accredited institutions of various kinds (Daniel, 2010, p. 117). For 10 million registered users, FutureLearn has a core staff of 130, relying on its 250 partner institutions for course development and academic support.

Although the open universities do not outsource academic tasks as much as open schools and MOOCs providers, they also operate efficiently. To serve its 200,000 students, the UKOU has 1,000 full-time academics, 4,900 part-time associate lecturers and 2,500 support and administrative staff. For comparison Oxford University, with 24,000 students, has 14,500 staff, of which 1,700 are academics.

The UKOU made an important innovation in academic organisation. Perry (1977, p. 205) noted that:
'Universities in general do not have a hierarchical structure of government. They are essentially

cellular in nature, each cell representing one academic discipline or department... The UKOU made a significant break from this normal system. Responsibility for individual teaching programmes... is vested in course teams, which are set up for the purpose. Nevertheless the course teams are, for their lifetimes, just as much cellular components of an overall structure, as are departments in other universities.

In open universities the academic structure is a much smaller part of the total institution than on campuses. The large sections of open universities dealing with operations - regional structures, production processes and student administration - are hierarchical rather than cellular. We discuss the challenges that poses for governance below.

Governance, Management and Administration

There are two reasons for treating these three functions together. First, they are less distinct in large-scale distance teaching operations than in classroom teaching institutions. Second, they are arranged differently in our three organisations of interest, which have different ownership structures.

With a few exceptions, open universities are public institutions, although without substantial government involvement in their day-to-day affairs. The UKOU's royal charter gives it the same legal status and protections as the older universities. Open schools, on the other hand, are mostly departments of national education ministries, with mixed results, as noted in the comment by Rajagopalan (2011, p. 4), that some 'State Open Schools resemble atrophied limbs of the State Education Department'. By contrast, FutureLearn and the US MOOC provider, Coursera, are for-profit commercial enterprises.

Distance education at scale can be conducted successfully under various corporate arrangements, provided that they give the organisation enough autonomy to respond to the needs of its clientele and influence the selection of its leaders.

Open universities are usually governed by some variant of the bicameral structure of board and senate common in higher education. Perry (1977, p. 206) described the particular challenge that this posed for the UKOU, which occurred partly because its planning committee had anticipated that there would be relatively few full-time academic staff, with the university using specialists on secondment for much of the course preparation. On this assumption the committee recommended that all full-time academic staff be members of senate. In the event, the university made little use of secondments for course development, so the full-time academic staff grew much larger than anticipated. When the author joined the UKOU as vice-chancellor in 1990 the senate had over one thousand members, although this was reduced to 100 in the 2000s. The larger body may have made decision making a bit slower, but this was more than offset by faster implementation because of wider buy-in to the decisions. Furthermore, students and part-time tutors, who had significant representation on senate and attended assiduously, ensured that decisions usually reflected students' interests.

The governance of open schools is simpler. The eight open schools profiled by Daniel (2010, pp. 110-140) are all directly linked to state ministries of education, although their success seems to correlate well with the degree of independence in governance and operations that the reporting ministry affords them. India's NIOS has achieved a good balance. It follows government rules for the terms and conditions of staff but has the General Body of NIOS, chaired by the minister, to set policy, with an Executive Board to oversee operations. Ferreira (2009, p. 195) commented: 'it is not coincidental the NIOS, the largest open school in the world, is not only the most autonomous of our case studies but also the most open in terms of academic regulations... and alternative vocational curriculum.'

Botswana's open school, BOCODOL, is a parastatal body (i.e. a semi-autonomous public institution run on commercial lines). This is also a successful formula and BOCODOL is embedded effectively in the national education system. The open school in neighbouring Namibia, NAMCOL, is also a parastatal body, but very subservient to the ministry of education, limiting its ability to plan its own future. However, the case of Papua New Guinea, where the open school started as part of the University of PNG but is now attached to the ministry of education, suggests that the ministry is a more appropriate home, because UPNG used to skim off part of the open school's fee income to spend on its own campus operations.

MOOCs providers operate as commercial operations for profit, although FutureLearn is 50% owned by the UKOU, which is a public university. MOOC providers have boards of directors in the normal commercial manner. The greatest challenge they face is to make money from learners and partners without straying too far from the original ideal of making courses freely available globally on the internet.

The acronym MOOC originated in Canada in 2007 to describe an open online course at the University of Manitoba titled, 'Connectivism and Connective Knowledge', (Downes, 2012) . It was offered to 25 fee-paying students on campus and 2,300 members of the general public who took the online class free of charge. It aimed to follow Ivan Illich's injunction that an educational system should 'provide all who want to learn with access to available resources at any time in their lives; empower all who want to share what they know to find those who want to learn it from them; and, finally furnish all who want to present an issue to the public with the opportunity to make their challenge known' (Illich, 1971, p. 75). In this spirit, 'all the course content was available through RSS feeds, and learners could participate with their choice of tools: threaded discussions in Moodle, blog posts, Second Life and synchronous online meetings' (Daniel, 2012).

Most of the thousands of contemporary MOOCs are inspired more by Silicon Valley and Wall Street than by those pioneering approaches, although, as MOOCs diversify, learners may have more latitude to mould them to their own needs. The principal challenge is that MOOCs are costly to create and yet, according to a standard definition, 'they are made available over the internet without charge to a very large number of people'. Providers have explored various ways of monetising MOOCs, including all of the following:

- Certification (students pay for a badge or certificate)
- Secure assessments (students pay to have examinations invigilated (proctored))
- Employee recruitment (companies pay for access to student performance records)
- Applicant screening (employers/universities pay for access to records to screen applicants)
- Human tutoring or assignment marking (for which learners pay)
- Selling the MOOC platform to enterprises for their own training courses
- Sponsorships (3rd party sponsors of courses)
- Tuition fees.

As a result, MOOC companies can have viable businesses, although this list suggests that the organisations least likely to make money are their partner universities. This may not really matter, however, because campus universities offering a few MOOCs may be happy to treat them as 'loss leaders' that burnish their brand and show off their liveliest academics. Always assuming, of course, that their MOOCs are attractive and academically credible. From my own experience, FutureLearn's development and quality assurance processes ensure this, and they sometimes have a transformational impact on the teaching strategies of the academics taking part.

While these three types of providers of distance education at scale have different governance structures, their management and administration have many similarities, largely because of the imperative of operating at scale. Large scale learning systems are analogous to three-legged stools (Daniel, 2010, pp. 57-60). The legs are: administration and logistics; course materials development; and student support. All teaching institutions have functions analogous to these, of course, but most classroom-based teaching can continue reasonably well if one - or even two - of the legs are weak. But for distance education at scale the stool is an apt metaphor, because if any leg is weak the whole system may collapse and students will desert it.

Perhaps surprisingly, given their very different contexts, the practices of our three scale providers are rather similar in the administration and logistics functions. This is because they all need to operate high-capacity IT systems for student records management and other functions. For example, in 2008, long before any widespread use of computers in its teaching, 30% of pupils in India's NIOS were enrolling online, a facility now available through the common service centres in the country's 600,000 villages (Daniel, 2010, p. 119). Moreover, when the heads of open universities from around the world met in Toronto in 2017, they agreed that: 'IT can prove most useful in the administrative and student support functions. Speeding up these processes has positive impacts on student progression and retention' (Daniel, 2019, p. 203).

How are courses developed for distance education at scale? MOOCs providers delegate course preparation to their partner institutions, offering whatever support is necessary and quality assuring the result. Over a decade, FutureLearn and other MOOCs platforms have refined successful formulae for course presentation which integrate short (5-10 minute) videos, podcasts, texts, research articles, simulations, quizzes and interaction among students on the social learning platform. This decentralized approach is the key to offering thousands

of subjects and, since each partner institution only contributes a small number of courses, it has an interest in making them engaging and impressing the learners.

Open schools also arrange for most course development to be done by external specialists and leading organisations in the field. NIOS has been a pioneer in developing vocational education and, to promote the concurrent development of hand, head and heart, offers life-enrichment courses such as Music, Painting, Art and Yoga. It is determined to give an appropriate place to life skills and a focus on the world of work, hence its decision to enable students to combine vocational and academic courses (Daniel, 2010, p. 118).

Although some courses are shared among India's state open universities, the tradition of developing open university courses in-house remains strong. Perry, (1977, p. 90) considered the course team to be the UKOU's most significant innovation and this tradition continues: 'Modules are developed by multi-disciplinary course teams comprising:

- Academics, educational technologists and media specialists contributing pedagogic and technical expertise
- Respected academics from other universities working alongside OU colleagues
- External examiners.

'This model has helped to build the University's reputation for innovation, rigour and quality and has been adopted by distance teaching institutions worldwide' (Open University, 2021).

The provision of student services and support is where the differences between providers of distance education at scale are most marked. As with course development, the open universities mostly keep this function under their direct control. The UKOU informs its students of these services on its website:
'The OU has a network of more than 5,000 tutors – the largest in the UK. Tutors mark assignments, provide detailed written feedback, and offer support to students by telephone, email, or computer conferencing. They also run group or online tutorials and day schools. Some are full-time members of staff, but most are associate lecturers: experts in their subject who combine their work as tutors with other academic or industry jobs' (Open University, 2021).

The organisation of this tutorial network is a vital and sensitive function. In the early days its administration was decentralized to 13 regional centres, where each programme area located a full-time academic. As programmes multiplied, however, more tutoring moved online and, when the UKOU encountered financial difficulties in the 2010s, only the UK's nation regions retained such centres, creating an internal controversy that became national news.

Most open school pupils are of secondary school age, although these institutions also attract adults who missed out on schooling for various reasons. Whether younger or older, however, these pupils require more intense and regular support than learners in higher or continuing education. India's NIOS conducts personal contact programmes of 30 hours (35 for science subjects) at study centres on weekends, holidays and convenient times during the week. These study centres, numbering over 3,000, are run by local institutions that NIOS accredits. Most are

non-governmental organisations (NGOs) with missions to disadvantaged children or those with disabilities. This creates win-win partnerships, since NIOS has access to study centres that share its aims, while the NGOs can offer schooling to the children alongside their main mission.

For MOOCs providers, student support is entirely delegated to the partner institutions, except for regular electronic communications from the centre to encourage learners to stick with their courses, enrol for new ones, or pay to convert them to formal qualifications. Each course in FutureLearn has an active social learning platform, where partner institutions monitor comments and intervene if discussions get off track or spread misunderstandings.

Leadership

We end with the challenge of leadership. Large-scale distance learning providers have corporate structures ranging from those nested in government through independent not-for-profit universities to commercial for-profit entities. Are there common qualities that the leadership of such diverse organisations requires?

In 'Open Learning and Open Management: Leadership and Integrity in Distance Education', Paul notes the need for different sorts of leadership depending on the institution and the circumstances. While individuals with a strong vision and communication skills can respond to major change more effectively than those whose leadership qualities are less obvious, they may be less effective in coping with longer-term adjustments to the change (Paul, 1990, p. 20).

Effective leaders must have the flexibility to adopt the approach required by the particular situations they face. Anyone who has moved among senior posts in different institutions knows this. For example, the author recalls the sharp contrast between the challenges he encountered as vice-president of Canada's Athabasca University (AU) in the late 1970s, and those he faced as vice-chancellor of the UKOU in 1990.

Established in 1970, AU was still finding its way gingerly into distance education by the end of the decade. Arriving in 1978, the author found a senate that wanted to change the direction of the academic programme at every meeting. To slow this spinning wheel, he argued that determined implementation of a reasonable option would take AU further than waiting to conceive a perfect programme. The staff, clearly relieved, set to work on implementing senate's most recent plan and AU took off, with enrolments doubling every year.

The situation the author found in the UK in 1990 was quite different. The UKOU was already an international icon conducting distance education at scale in a highly effective manner. But energy was low and the staff were depressed after a decade of a Thatcher government, not because of cuts in funding, but because the minister had launched a witch hunt for Marxist bias in UKOU course materials. Moreover, in the wider world, the honeymoon period of distance education inspired in by creation of the UKOU had ended. Critics began to ask how much of a revolution it really was. The Fordism debate captured the Zeitgeist of the times. The vice-chancellor's first task was to restore confidence and energy. Thatcher had just left the stage, so

another imperative was to rebuild relations with the government, which was planning a major reform of UK higher education - although we were unaware of that in 1990.

In a later book, Paul (2015) takes an ethnographic approach to the leadership of Canadian universities in the period 1990-2010, with a good summary of the academic literature on leadership generally. In the light of this literature and his personal experience, this author considers that the leadership needed for distance learning at scale is determined as much by the conjuncture that the institution faces as by any personal vision that a new head brings. In particular, a leader needs these five qualities:

- *A conviction that the institution can be a catalyst for global change.*

In ODL, such convictions often embrace openness, widening access and using technology, but Perry came to the UKOU with a different ambition: 'I had long been concerned at the pitiably inadequate standard of most of the teaching that went on in the established universities' (Perry,1977, p. xv). He believed that if teaching at a distance could develop a better approach, 'it should ultimately spread back into the established universities and raise the standards of teaching everywhere'.

- *The skills and determination to sustain excellent relations with government.*

This goes beyond the self-interested relationships that all executive heads of public institutions like to have with their government. Because they can roll out new programmes nationwide with consistent quality, institutions operating at scale are natural partners to help governments implement their own objectives for education and training programmes. This has been successful in jurisdictions as diverse as Indonesia (training of teachers and health-care workers) and Quebec (PERMAMA) (Daniel, 2010, p. 146).

- *Familiarity with the administrative and bureaucratic functions of the institution.*

As our analogy with a three-legged stool illustrated, large institutions will underperform unless course development, logistics and student support all work well. Since these are scale operations, any changes must be carefully planned. The UKOU experienced a serious hiccup in the mid 2010s when it expanded online tutoring with insufficient pilot testing. Leading a large distance learning organisation is a full-time job, which requires constant attention to multiple functions.

- *Ability to scan the environment and anticipate the implications of technological developments.*

Using the most appropriate teaching and organisational technologies is central to the mission of a distance learning institution, but false moves will be costly and needed changes take time. This is a huge challenge for open schools and open universities, where the speed of change is essentially determined by the equipment that students can access at home.

- *Persuasive advocacy for new initiatives.*

Absent special funds to launch additional programmes, new initiatives require temporary sacrifices of resources by existing units, which usually see the emergence of a new area as a threat. It is the leader's task to persuade colleagues of the institutional benefit. An example of success is the UKOU's law degree, now the most popular in the UK, which was a late addition to the university's programmes.

Conclusion

The covid-19 pandemic stimulated dramatic diversification and expansion in digital distance learning, as schools and universities around the world switched rapidly to emergency remote teaching. Although much teaching returned to the classroom as the pandemic receded, the new capabilities for distance education that teachers and institutions have acquired will be helpful in responding to the huge growth in demand for education and training foreseen in the coming decades. We have shown that even partial achievement of the UN's Sustainable Development Goal 4 will bring hundreds of millions of new pupils, students and learners into secondary schooling, tertiary studies and continuing education. The new capabilities for distance education that campus institutions have developed, although useful, will be insufficient to meet this demand. It will require organisations that can offer distance learning at scale in a spirit of openness. We have explored three examples, open universities, open schools, and MOOCs, focussing our attention on the operational challenges of running such providers, which already account for millions of learners worldwide. These organisations bring other important assets as the world recovers from covid-19 and addresses three major challenges: reducing the inequalities within and among countries; helping those pushed back into poverty by the pandemic; and fighting climate change.

Our three types of scale providers of distance education all have the mission of offering ready access to learners of all types, an approach that the campus institutions switching to emergency remote teaching did not try to adopt. The term '*open* and distance learning' originated with the scale providers and openness will be a crucial feature of educational provision in the 21st century. A primary element of openness in distance education at scale is to operate at lower costs than campus institutions. In doing so it leaves a much smaller carbon footprint and can help the whole education sector combat climate change.

Although open universities, open schools and MOOC platforms each have different ownership and governance arrangements, they present similar challenges of leadership, management and administration. For institutional success the three key functions of course creation, student support, and logistics must all function impeccably around the clock and on a large scale. This requires leaders and managers who are wholly committed to the ideals of openness and teaching at scale, rather than the comforts of selective admission and small classes.

(7,208 words)

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