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Chapter 5 - Leading innovation: digital education in a traditional university

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LEADERSHIP AND LEADERSHIP FOR INNOVATION

As has been reviewed in earlier chapters of this book, the world within which higher education operates is changing steadily and sometimes rapidly. External forces now impact universities across the world, many of which have existed relatively unchanged for centuries, and are shaping their thinking and actions (Bastedo et al., 2016; European Union, 2015; Rizvi et al., 2013; Zemsky, 2013). Short-, medium- and long-term strategic decisions are having to be taken with limited hard data on which to base those decisions (so-called VUCA, Bennett and Lemoine, 2014), and these place new demands on university leadership and management as well as demanding new skillsets. Unsurprisingly then, the topic of university leadership has become an increasing focus of attention both by academic researchers and writers, and by universities and their funders/regulators

Academic leadership, especially for ‘turbulent times’ (Dopson et al., 2016; Jones, 2011; Middlehurst, 2013; Gayle et al., 2003; Krull, 2012), is a subset of the attention paid to leadership more widely, especially for commerce and industry, and both share common features. In the business sector there is a wide range of publications on ‘how to be an effective leader’ (Adair, 2009; HBR, 2011; Owen, 2017) and how best to nurture leadership within the organization (‘leadership development’; Adair, 2005; Day et al., 2014; Avolio, 2010). In parallel with these practical guides there is a large academic and research literature that explores models of leadership and leadership in different contexts (manufacturing, public sector). Given the pressures on modern business, including globalization, digital technologies, and recession-driven income reductions, a prominent topic is leadership for innovation (Deschamps, 2013; Deschamps and Nelson, 2014).

Contrasting with the well-known ‘hero CEO’ model of leadership of the late-20th century, itself now partially discredited (Senge et al., 1999), the focus of leadership models has begun to embrace the idea of ‘distributed leadership’ (sometimes called ‘shared leadership’) (Dinh et al., 2014; Bolden, 2011). Distributed leadership first took root in academic leadership thinking (Jones et al., 2012, 2014) and has more recently spread into mainstream thinking in the business leadership sector (Mihalache et al., 2014). It clearly resonates strongly with organizations with high-level knowledge workers, like universities, where a relatively flat hierarchy exists, and where world class expertise and recognition can (indeed should) be found at all levels.

In response to the significant external pressures being felt by higher education institutions in the US, Australia, New Zealand, and the UK in the last years of the 20th century, a number of commissioned and independent reports and books were produced that addressed these challenges to university leadership and proposed approaches, including new ways of thinking about educational leadership (Scott et al., 2008; Bolden et al., 2012). (In parallel, similar re-thinking was going on in the school sector

(Spillane, 2006; Harris, 2008).) Some national or regional agencies were set up to help universities to develop their leaders, both existing and aspiring (see for example, www.lfhe.ac.uk; www.herdsa.org.au; <https://podnetwork.org>). This change was slower coming in continental Europe and Asia/Far East, which was partly due to a buffering of external forces by the state (for example, lack of private HEIs, slower impacts of digital technologies, less internationalization, less reliance of HEIs on earned income). Autonomy issues, that still beset HEIs in many European countries (Pruvot and Estermann, 2017), slow-moving and sometimes conservative state regulation (Haywood et al., 2015) and rotating senior management positions (Rector, Vice Rectors), perhaps made the locus of responsibility for change less straightforward than for the US, UK and Australian university sector.

I shall not attempt to review the whole field of academic leadership and leadership development but will point to a few sources that have influenced my own thinking throughout the period when we were introducing digital education across the University of Edinburgh. These sources may be of use to others wishing to follow a similar path, in conjunction with the case studies and lessons learned presented in this chapter.

- Despite the widely-used term ‘change management’, I prefer to use the term ‘leading change’, following the thinking of John Kotter. His eight organizational steps for change, including creating a sense of urgency (in a university with generally slow changes to its educational provision) have been influential for me (Kotter, 1998; 2012);
- Universities clearly do have distributed leadership (Jones et al., 2014). It spans all ‘levels’ and must be drawn on and brought on board, not necessarily all at once in a large organization, but at the same time, vision and commitment from senior levels is vital for change projects (Cummings and Worley, 2014);
- Universities have multiple ‘businesses’ and how these are carried out varies by subject area (or at least broad domain). Becher’s academic tribes (Becher and Trowler, 2001) must be taken into account, and a way found to create university-wide (or College-wide) scale-up of educational innovation whilst at the same time letting subject areas adapt the broad objective and design to their own pedagogies and opportunities;
- I have found value in the resources for university leadership which are produced by the Leadership Foundation for Higher Education, set up with the foresight of the UK HE funding agency (HEFCE) in 2003. Its case studies and research studies have been useful in developing our own leadership paths (Bolden et al., 2012; 2015).

In addition to awareness of the importance of leadership for major change projects, the following models and approaches have been useful to us at the University of Edinburgh as we plotted our course into digital education over the past 25 years:

- Gartner’s Hype Cycle (Gartner, 2017) describes the pathway taken by new technologies and developments. This helped us to think about whether what we were planning was ‘bleeding edge’ or adoption of what was becoming mainstream in the world HE sector (although it may still be innovative for us). This influenced our arguments significantly (arguing to be a leader in the field versus arguing to keep up with peers);
- Innovation across a large organization is a slow process and in universities as well as business and wider society, the diffusion of innovations model applies (Rogers, 2003). Thus, innovators and early adopters were key to what we wanted to do, as a lot of pilots and explorations had already taken place before we put any of our large developments into place. I also personally avoid the use of the term

‘laggards’ as this is a pejorative label, when ‘justifiably cautious’ might sometimes be more applicable to those Schools and colleagues who come on board later;

- We aimed to be prepared for strategic opportunism (Isenberg, 1987); it pays off. Whether it is the option to take up a large opportunity (for example, the appearance of MOOCs) or a small one (a new champion arrives in the university with an innovative idea), being open to new opportunities is vital and overly rigid plans can be a hindrance.

ABOUT THE UNIVERSITY OF EDINBURGH

The University of Edinburgh is one of the oldest in the UK, founded in 1583, with a long tradition of providing high quality first and higher degrees in most subjects, including all professions. In the academic year 2015–2016, student enrolment was 37,500, total staff complement was 13,500 and its turnover was £900 million, with £250 million from competitive national and international research grant awards. The university is ranked number 19 in the QS World Rankings, and in the top five in the UK. The university has very strong international relationships, with staff and students from all countries of the world and 40 per cent of students are from outside the UK. It is an active member of LERU, Universitas 21 and the Coimbra Group.

In 2002, and with some modifications since, our structure and operations were streamlined from 11 Faculties and 130+ Departments into a six unit structure of three academic Colleges, containing a total of 23 academic Schools, and three university-wide Support Services, one of which includes the Principal’s Office (Principal = President or Rector). I cannot underrate the importance of this development to strategic decision-making: it gave us a renewed leadership, governance and management system that was fit for purpose for the 21st century. Some of our peers have since modelled themselves on this university design.

Briefly, our governance model is one of devolved authority guided by centrally-agreed policies and strategies. Senior officers are assigned responsibility with budgetary authority and supported by committees (in Schools, Colleges, and at top level), with decisions ratified by Senatus (academic affairs) or University Court (administrative affairs). Many senior officer positions (academic and administrative) are fixed-term appointments, the most senior after open international competition, and none are elected. Increasingly, middle-level posts, such as Heads of Schools, are now also fixed-term contracts that are advertised openly rather than being filled through internal, rotating, appointments. This model offers clarity on the loci of responsibility for all areas of business.

Achievement of the University’s objectives, as set out in its overarching Five Year Strategy, is addressed through a three-year rolling annual planning process that begins at School and Service Unit level, works up through the Colleges and Support Groups, and produces a single accepted University three-year plan with targets and costs. Major project funding beyond the annual funding capacity of a College or Support Group (for example, for a building or a major IT system) is possible by drawing on central strategic funds. Such projects are led by a member of the SMT and managed by experienced staff working with the University’s project management protocols and toolkits. External formative and summative evaluations are the norm. Links to some of the key resources regarding strategic projects at the University of Edinburgh can be found here:

Risk appetite: <http://edin.ac/2hz9rWo>.

Major strategic project governance: <http://edin.ac/2hAp00c>.

Project management toolkit: <http://edin.ac/2zNds3l>.

A BRIEF HISTORY OF EDUCATIONAL TECHNOLOGY AND INNOVATION AT THE UNIVERSITY OF EDINBURGH

The University of Edinburgh has a well-developed eLearning infrastructure, guided by a strategy that links to the university's top level strategy. Over 25 years, we have invested heavily in eLearning tools and support, regularly benchmarking and valuating our provision, and conducting research into technology-enhanced pedagogy. Our understanding of how to make these practical developments successful is based upon research over many years into online learning (for example, the Digital Education Research Group at www.de.ed.ac.uk) as well as a strong international benchmarking network of colleagues in similar advanced positions with respect to educational technologies.

Our vision for teaching and learning that has technology as a core element of both design and delivery was set out around 1990, when it became clear that IT was moving to greater maturity, communications would increasingly be carried out through it, especially in globally-operating organizations and that learning by doing would be better than trying to learn through watching others. We could see that educational innovation was going to contain technology and that technology offered affordances that might remove or minimize current challenges for us of increasing scale of operations, increasing mobility of staff and students, and designing education for the future rather than the present. We wished to be a leading university in this area.

1992 – Email for All

In 1992 we began with a programme called 'Email for All' in which we aimed to offer an email address to all staff and students so that they might communicate with each other and more widely with colleagues and friends. This was our first university-wide initiative with educational technology and we learned some valuable lessons that served us well in the future. Dr Hamish Macleod and I had to contend with: a general wariness of change, including 'the traditional face-to-face methods are better, a fear that students would find electronic communication 'impersonal' and local desire to be distinct against a uniform system ('won't work here'). IT staff (including the central IT service, who were significant gatekeepers) also weighed in with their preferred choice of email system, which resulted in us initially having several, although over time this was reduced steadily to a single email system. We learned about the importance of face-to-face and self-paced training, of working with early adopter Schools and influential academics to get face validity and proof of concept and we found that our customers (that is, students) were powerful allies and should always be on board early. We learned to be patient and willing to listen to all arguments, no matter how many times we had heard them. Over time we built up trust and were helped by the lack of disasters (although these did come later in other projects!).

1998 – Central eLearning Unit

By 1998, it was clear to those of us who scanned the horizon, especially that in US HE, that learning technology (later variously eLearning, Technology Enhanced Learning, Digital Education) was going to be an essential component for all universities, and we felt that the University of Edinburgh should be in the vanguard. In 1999, this argument was accepted and the SMT agreed to finance a new small eLearning unit, which later became the eLearning Team plus Learning Spaces Technology in the central IT and Library Support Group. Over the last 20 years it has provided: a robust VLE for over 100,000

simultaneous users; online assessment systems; an e-portfolio; personal response system ('clickers'); and a wide range of smaller innovations. Alongside this the IT teams have created a substantial single staff and student portal (MyEd), which provides access to almost all digital systems for teaching, research and administration, and the library teams have developed a massive digital library with millions of e-journals and e-books, advanced search tools, open access repository and a course reading list technology.

The initial eLearning unit was the basis upon which later educational innovations using technology were built. Establishing this new unit, and the strategic area which it served, taught us a lot about business cases for educational technology and innovation: the location of key senior sponsors to support the business case at SMT; hard evidence of the progress peer universities were making, especially those in the US and Australia; starting small but with a path to growth; and finding key academic voices who needed this kind of reliable service to underpin their own evolving teaching methods.

Around this time also some Schools (for example, Education, Law, Medicine) were already investing in educational technology, some local support units were being set up and individual academic staff were experimenting with new approaches to learning and teaching. This was very positive in that it proved the point we wanted to make in our business case, as these Schools were seeing need and opportunity and investing, but it also provided a challenge for us in the central service as this made some of our early adopters less than willing to join a university-wide central venture, preferring their local solutions. The lesson for us was to seek a constant balance between central versus local activity, applying common standards when we could and always looking for cross-talk and ideas sharing when not. This thinking resulted in us establishing an important community of practice (CoP – Wenger, 2000) for academic and support staff (eLPPF) and an annual elearning@ed conference, now in its fifteenth year.

2003 – Principal's eLearning Fund

By 2003, it was clear that the range and diversity of eLearning applications and approaches available to us was expanding rapidly and that we needed to harness the exciting ideas of our academic staff to create large local developments with alignment to College objectives and with the potential for university-wide scale-up or at least lessons for the adaption of them. We chose to use a competitive funding model, run university-wide, but where all proposals from academic staff needed School approval plus College 'strategic alignment approval' before being considered. Centrally we would coordinate and learn, seek lessons for wider use and scale-up any suitable opportunities. This fund, of £3.8 million over five years was called the Principals' eLearning Fund to signal its top-level support and approval. We funded 61 projects and applied formative and summative evaluation to enable us to demonstrate value for money and good programme management.

2010 – Distance Education Initiative

By 2010, it was clear that fully online distance education was maturing beyond its early exploratory phase and was a viable approach for universities with a strong educational technology infrastructure. It would not remain the preserve of specialist open universities or distance education providers. We therefore made the case for a major investment in university online degrees, the Distance Education Initiative (DEI). The way we approached this large-scale innovation is described in Case Study 1 below.

2012 – MOOCs

Suddenly, in 2012, the first Massive Open Online Courses (MOOCs) were launched, in California, with great press interest and some (wild) speculation about the imminent demise of the traditional university (see the bibliography for this at <http://bit.ly/2zOkDcl>). We decided that this was an opportunity which we would take early in its development, that is, in the Gartner Innovation Trigger phase (Gartner, 2017), and our decisionmaking and leadership processes are described in Case Study 2 below.

2015 – Open Education

By 2015, we could see that we were entering an era of Open Education, encompassing open educational resources (OER), MOOCs, hybrids between these, plus emerging forms of educational offerings that could be made openly available and openly licensed.

This is not the end of the story. We are now embarking on an implementation of learning analytics and reflecting on what teaching in the University might look like in the near to medium future.

The following two case studies show in more detail how we put into practice the lessons of leadership discussed above.

CASE STUDIES

To exemplify how major digital education developments were initiated, managed and mainstreamed in the University of Edinburgh, it is instructive to look at two case studies; namely why and how we developed (a) a substantial portfolio of fully online Masters level courses and degrees and (b) a wide portfolio of MOOCs on three different commercial platforms. I shall look at what we did through seven 'lenses':

1. senior level buy-in;
2. investment processes;
3. balancing local and university-level aspirations;
4. incentives for Schools and academics;
5. targets and return on investment;
6. maintaining quality in education;
7. training for new modes of teaching and learning.

These case studies analyse major changes to the traditional/normal academic and support service operations and they required significant buy-in from a wide range of individuals and groups. Not all of that buy-in came immediately or even easily. From these case studies I shall then draw out some of the lessons that we learned, and that are guiding our current thinking and actions.

Case Study 1: Fully Online Masters Degrees and Courses

The decision which we took at the University of Edinburgh to begin to offer fully online degrees is an example of ‘at-our-own-pace’ decision making, that is, one that was not forced on us by external circumstances nor one where speed was of the essence. (This contrasts with the case of MOOCs discussed next.) One trigger for starting to consider fully online degrees came from our desire to fulfil our mission of offering educational opportunities to as many people as possible, coupled with our realization that more potential Masters students were asking us about online study, as residential education was not an option for them for career, cost or family reasons. The other trigger was the maturing of online education technology and pedagogy, our considerable experience with the use of technology in our residential degrees and greater access of potential students worldwide to reasonable bandwidth Internet.

Through preliminary work done by Professor Sian Bayne in Education and Professor David Dewhurst in Medicine we had carried out a number of explorations of fully online courses, and these had given us confidence that we were in a strong position to embark on a major development in this area. (Small-scale pilots and innovations at local level, with collaboration and involvement of central services, which can then lead to university-wide implementations, has been an innovation-to-mainstream model which we have followed since the early 1990s. It requires good communications and relationships between staff in both academic units and support services and a preparedness to be flexible and understanding of local and university-wide aspirations and challenges.)

After informal discussions at senior level, and with academic staff who were already innovating in online education in 2010, a formal proposal to invest in the creation of a full portfolio of online degree programmes was brought to the senior management team (SMT) by the Vice Principal (JH) leading the eLearning, Library and IT Support Group. After approval in principle, this plan for a Distance Education Initiative (DEI) was refined and put to the senior finance committee and then, after further refinement, to the University Court for approval of funding. As this was to be a strategic project (we define projects according to cost and impacts) it had to be led by a member of SMT and the lead was assigned to VP/CIO/Librarian (JH). There would be a DEI Steering Committee to guide the VP in leading the project and regular reporting to SMT and to Court on progress. However, this was really a major educational innovation project rather than a technical process innovation and so of course academic approval was needed as well as the financial business approval of Court. Thus, there was a parallel academic consultation with the senior learning and teaching committee and quality assurance committee and especially the senior staff leading these areas. Their approval was ratified at University Senatus.

These processes created buy-in for the vision and the approach, at senior levels at least, although this did not automatically mean immediate buy-in by all Schools and by all academic staff. This wider process was clearly going to take time and might never be complete, but in a devolved and large university acceptance of that diversity is part of good leadership. We also decided that teaching on fully online courses was going to be ‘normal academic business’ in the future and so everyone needed to be involved not just a few innovators. We did not want to partition it off into a ‘special division’ (a skunkworks, see Wikipedia, 2017) which generally do not scale up across the organization (Blank, 2014) but wanted to locate it in Schools with existing academic staff.

Two attributes of the DEI development were core to its acceptance by the University: it had to offer at least as high a quality of education as our traditional, on-campus, education offered (‘same quality, different format’) and it must at least break even financially after its first five–six years of operation.

The key to unlocking strategic funds in the University of Edinburgh is to be able to demonstrate clearly, and with evidence for predictions, that there will be tangible benefit to the University from investing in a particular development. This applies regardless of whether the development is a building or an

educational innovation. There must be a positive return on investment (RoI) in the short, medium or long term. For the DEI development, this return was to increase student recruitment from around the world with fee income to match, and (less critically) enhancement of the University's reputation for educational innovation. This raised interesting questions, which were debated to agreement: how many students might we realistically recruit per annum? What fee levels should we set for this new class of student? At what degree level should we offer courses? What investment level was appropriate to support Schools to design and deliver new online degrees to a self-sustaining level? What incentives might result in academic Schools seeing this as a viable component for their academic and business planning processes?

Our answers to these questions, which were incorporated into the approved DEI Plan, were that: we were aiming for the same number of online Masters students as residential Masters students by around 2020, that is, perhaps 8000–10,000 (mainly expected to be part-time in contrast to residential students); all online programmes would be at Masters level (which we felt was an area of real strength for us and of growth internationally); none of these students need ever come to Edinburgh for any part of their study; with a single fee for each degree programme regardless of the location of the student (many of whom were mobile anyway) and that fees would not be lower than residential programmes (to prevent an image of lesser quality). In order to achieve overall as well as local financial success, each degree programme would need to aim to recruit at least 100 students per annum and their business cases would need to reflect this, as would the pedagogical design of the courses. (At the time, this number was well above the typical recruitment of Edinburgh Masters programmes.)

Funding would be given to Schools through a competitive process analogous to that of research funding, with matched funding expected, course design, academic and financial business cases made and annual reporting mandatory. The investment level was set at £1 million per annum for five years, and a new, fully online Masters degree might receive around £200,000 funding over a two–three-year period. There would be an annual funding round. The aspiration was that eventually all Schools would participate but it was left to them to decide when they were ready, albeit there was 'strong encouragement' from the SMT and there was support and advice always available. Some Schools were already identified as early adopters (Education, Law, Medicine, Vet Medicine) so the first of these degree programmes would not be hard to define. The Steering Committee, composed of representatives from the major areas of the university plus some local online education experts, made the decisions on which proposals to fund and when to negotiate different funds or outcomes and it monitored DEI progress.

To encourage Schools and their academic staff to adopt these new degrees as part of their normal portfolio of work, we needed to reduce barriers and provide incentives. Finance is always a big issue in universities – there is more that can be done but money is always rate limiting. The DEI programmes provided (quite generous) funding to Schools against their business cases with which they could buy out current academic staff from existing activities to focus on the new online programmes or could recruit new academic staff (initially temporary) with the right skills and interests. In addition, for the initial period, there was no tax (top slice) on the School fee income from the online Master students (usually this was 20 per cent). In addition, the Library had some funding to enable them to purchase or clear copyright on texts needed online; there was a new, more agile and attractive, digital learning environment than in the main University system, and there was extra help with marketing. Training for new pedagogies and technical support were enhanced in a dedicated team brought together from the Digital Education Team in Information Services and relevant staff from the University's educational development unit, the Institute for Academic Development (IAD). They created a community of

practice (CoP) for the academic and support staff involved in the online degree programmes so that experiences could be shared and good practice disseminated.

In the event some support services also needed additional investment, which was handled by a light touch version of the School funding process, except that funding was substantially smaller and in smaller allocations. Services which needed help were mainly those where large investment was needed (for example, eLearning for the new VLE) or those where face-to-face services had to be radically re-thought (for example, Student Counselling, online Open Days for 'visiting' potential students, English Language training and testing).

An influential development for some of the early adopters was that, around the same time as the DEI was introduced, new thought was being given to the criteria for promotion of academic staff, a process which until that time had emphasized research and had given little guidance to applicants for basing their case for promotion on teaching innovation and quality. The new criteria, which had been developed with input from academic staff with substantial experience in advanced pedagogy and leadership in educational change, enabled academic staff to use the innovative work that they did under the DEI programme to add to their case for promotion, and over time an increasing number of staff were promoted to more senior posts. Some of these promotions were inside the University of Edinburgh and some academic staff gained more senior posts at other universities. Everyone involved in educational innovation was encouraged to publish papers, speak at conferences, apply for research grants in general and subject-specific higher education and to develop a scholarship of teaching and learning. Examples of how this promotion process is organized can be found on the university's website at <http://edin.ac/2hBYkMv>.

The choice of degree subjects to offer in their online Masters was up to the Schools; there was no compulsion to offer particular programmes and so although this meant that there was good ownership of what was produced sometimes these courses proved less attractive to potential students than other subjects might have done. This was accepted as a necessary part of bringing all Schools on board. As it turned out some subjects recruited well that might not have appeared a priori to be good choices!

Like all universities with strong devolution of authority and decisionmaking, balancing local and university strategic aspirations was a challenge for the DEI leadership. University-wide annual planning and budgeting is not only about the future but also acts as a focus for seeking evidence of progress in the past year. Thus, for online degrees, the addition of identifiers for online students to the student record not only enabled us to offer more appropriate help to these students and to ensure their fees were untaxed for the Schools, but also to report to Committees and the SMT on progress, School by School. This reinforced the expectation of the SMT that all Schools would come on board, and over time more robust encouragement and advice was offered to those Schools that were most cautious about engaging. Schools were already expected to increase their Masters student numbers in order for the University to reach its targets in this area and the online Masters students were seen as part of this drive.

By the end of 2016, we had a portfolio of 66 Masters level degrees (MSc, PgCert, PGDip) offered by 17 out of 23 Schools. Schools in Science and Engineering found it hardest to re-think their education into this new format, partly perhaps because they were less accustomed to offering taught postgraduate degrees anyway. Medicine and Veterinary Medicine was most prolific, with 36 degree programmes from five Schools.

We had recruited a total of close to 10,000 students, and in 2016–2017 had around 3000 enrolled, almost all of which were part-time. This compared to around 6000 residential Masters students,

almost all of whom were full-time. Approximately 50 per cent of the online students were from outside the UK, distributed widely across the world. Their satisfaction with their online educational experience was very high and equal to that of residential students, when evaluated using external, independent, surveys.

Lessons learned

The DEI Phase One ran from 2010 to 2016 and our report at the end of that period gave data about progress made, but we also documented the challenges we still faced, which required some further time, investment and re-orientation to resolve. The most difficult aspect of the DEI programme had not been designing and delivering online degrees to high quality, nor finding interested academic staff and Schools wishing to innovate, but designing effective marketing strategies that would bring in large numbers of applicants with the right qualifications. The University's traditional recruitment channels just did not reach these new audiences of working adults, well separated from academic life and contacts. The few degree programmes that were successful in recruiting large numbers of students at the outset were those with strong reach into the relevant professional communities where continuing professional development was the norm.

Postgraduate medicine is one such area and the degree programmes targeted to this community, in partnership with the Royal Colleges of Surgeons and Physicians of Edinburgh (RCSE, RCPE), were and remain very successful in attracting students. We decided not to partner with potential external commercial organizations that offer online education services as we felt that this was our core business for the future and so we needed to learn how to run online education ourselves. It may now be the time to re-consider this decision, especially as some of the partnering companies have unbundled their services and offer recruitment as a standalone option.

Another lesson learned was that these Masters students largely needed less support from the non-academic support services than residential students, but teaching was more time-consuming (although very rewarding) if we were to deliver high-quality education online. There were savings being made from this form of education, but these were either in different budget lines to those of the Schools offering the degrees (for example, classroom spaces or libraries) or were un-costed and diffuse (for example, lack of timetable conflicts). This particular problem was never resolved; indeed, it could not be without a major re-think on the University's financial structure.

The online students also had more varied patterns of progression through their degree pathways and many more opted to graduate with a PGCert (60 credits) and PGDip (120 credits) than did residential students who mainly completed the Master degree (MSc is 180 credits). This meant that data analytics for these students (for example, per cent graduating on time, retention) was harder to compute as their final exit point and speed of progression was unknown until they made their decision, as they could change their minds mid-programme. Indeed, some opted to take the study programme module by module and thus could decide they had gained what they wanted and depart at any point.

Finally, scaling up to 100+ students joining each degree programme per annum was not just a recruitment problem. For many Schools, this required a real re-think about how to design and run Masters degrees and how to remove bottlenecks around projects and group sizes. It would also probably require a more flexible curriculum than many Schools wished to offer, with two intakes per annum (instead of the standard one) to spread the programme more evenly through the two

semesters. The two-semester-per-annum model was itself a limiting factor for some potential students, as it reduced the speed at which they could progress to graduation. Changing teaching to an all-year-round model is still a step too far for many academics and support staff.

Case Study 2: Massive Open Online Courses (MOOCs)

In contrast to our decision to offer fully online degrees (DEI) in which we chose how and when to proceed, the decision whether to offer MOOCs was subject to significant time-dependent external factors. In mid-2012 we were offered the opportunity to join colleagues at Stanford University in their new Coursera venture and early membership brought with it the prospect of being the first European university to offer MOOCs (Haywood and Macleod, 2014; Haywood et al., 2015). As the media interest in MOOCs was intense at that time, joining Coursera would also give us a chance to demonstrate very publicly our desire to fulfil our mission to offer education to as many people as possible and it would also enhance our reputation as a university which innovates in education and the use of technology. Early adopter benefits were clear, although so were the risks. This was less like the usual education innovation project and more like large research or commercialization ventures and it needed decision-making and leadership to match. We had not planned to offer any fully online non-credit-bearing courses, nor short courses outside our degree programmes, but this was a situation in which strategic opportunism was needed.

To ensure that a rapid decision was made, but one that had been through an appropriate governance process, the light business case for offering MOOCs was put by the Principal and VP/CIO to the SMT and to the leaders of University Court and Senatus, over a period of a few days and out of the normal cycle of meetings. The benefits as well as the risks were outlined and the initial start-up funding and staffing was identified within an existing annual budget (an internal strategic fund inside the Information Services Support Group). This meant that a fuller discussion and business case could follow later, as further funds might well be needed if MOOCs turned out to be a growth area, which was quite unclear at the time. An initial set of six possible MOOCs were identified and, after due legal diligence, we signed our contract with Coursera. Others also identified the need for good governance of their MOOC project (Morris et al., 2014).

From the outset we put in place some initial steps to maximize educational quality and to minimize risk and these largely remained constant throughout the first four years. Although MOOCs were not University credit-bearing courses and the learners on them were not University registered students, we did regard them as a full part of our educational offerings and so quality was important to us. We wanted to be able to say with confidence that this was the case and so we devised a rapid and light version of our standard processes for course approval and post hoc quality assurance. We did this by working only with the two top-level committees that approve and quality assure courses, setting aside the usual route from School committees, to College Committees to top-level committees. (The standard process for degree programme approval through this process can take one year, often more.) As MOOCs were so different to the usual university courses we worked with the members of these committees so that we all understood what was needed to approve the design of a MOOC and to assure quality after it had run. This proved highly useful in that the committee members then took that knowledge with them into their Schools and support services and so a wider understanding of MOOCs resulted.

Part of the drive for high quality was our decision to implement mandatory training for online tutors, unless they could demonstrate prior experience in this role. We set norms (and minima) for numbers of online tutors per MOOC and hours and days of online engagement. In the event, especially in the early iterations, academic staff were very active too, so oversight of the progress of the MOOCs was high.

As MOOCs were a completely unexplored area in 2012 we knew that a lot of learning would go on. Many ideas would not be from the central team but from the academic staff teams leading MOOCs and so we created a community of practice (CoP), modelled on the lines of that for the online degrees, to ensure that experiences and ideas were regularly shared between all involved in the MOOC project. This proved extremely valuable in the first two years of MOOC explorations and innovations and as the Coursera platform itself continued to develop rapidly.

Although the MOOCs were tightly managed by the central eLearning support team with VP oversight, the design, content and delivery could only come from the academic staff in the Schools and so each MOOC had to be signed-off by the Head of School (as SRO for the School), to ensure that the terms and conditions were clearly accepted. These included a minimum of three offerings of the MOOC over three years, provision of online tutors, compliance with copyright and so on and commitment to deliver the MOOC on time for launch. In return, whatever revenues were gained from the MOOCs (for example, through certificates, licensing to others) would be given to the Schools as an incentive to participate. In the event this revenue stream turned out to be a little larger than we had expected at the outset, although it was never the main return on investment.

Indeed, we were clear at the outset that 'making money' from MOOCs was not an expected outcome and initially we felt that breakeven would be the best we might achieve. We knew that we did want to reach new learners worldwide, to explore how these novel educational forms might best be designed and run across a wide range of subjects and to work with colleagues in other MOOC-offering universities to share experiences and courses. The main risk that we saw in the initial period was that some of our MOOCs might fail spectacularly with consequent adverse publicity and recriminations. This was significantly higher than with other educational innovations as it took place in the public eye at a time of high media attention and hype. Other risks were that our own students and staff might not regard the venture as positive and so the leadership worked hard to ensure that all key contacts were well-informed of what we were doing and, importantly, why. In the event all our MOOCs performed very well and our staff and students raised no criticisms. Media attention was very positive and we approached this area with a view to agree to all request for interviews and for presentations at events whenever possible, by the academic staff offering our MOOCs as well as the project leaders. A lot of effort was put in by the University press and communications team to ensure all our press and media outputs were of high quality and reflected well on the University.

Although our view of the risks involved in offering MOOCs fell over time as we produced successful courses, we retained a central process to select new MOOCs, to make the video and multimedia, to oversee the course designs and to liaise with the MOOC platforms, including handling technical and administrative procedures. (A similar process was operated by other European MOOC-offering universities, for example EPFL in Switzerland: <https://moocs.epfl.ch/mooc-factory>.) MOOCs could only be mounted on a platform if they had been through the central University process, overseen by the VP, who also represented the University at senior level with the MOOC platform companies. This need for a coordinated central process was reinforced by the opportunities to join two other MOOC platforms, FutureLearn and edX, with some external pressure to do so. The negotiations with them, plus with Coursera as it changed its business processes and finance processes and wished to change its contract with us, meant that strategic decisions were still being taken several years after the initial

go/no-go decision in 2012. This meant that offering MOOCs did not really reach a business-as-usual position, despite the range and scale of our involvement, as significant innovation and evolution continued over time.

Clearly as the number of MOOCs being produced went beyond that of the original six, investment had to increase too and so a funding line was set up for annual planning to cover the central (IS) costs, backed up by a normal business case. Effectively this set a cap on how many MOOCs could be produced per annum (around five–six) unless additional funding was to be made available by the School or an external partner (for example, research agency, NGO). Of at least equal value was the academic staff effort that was required to create a high-quality MOOC, which we estimated at around 30 working days (enough time to produce a research proposal). To ensure that this funding and effort was being spent wisely on the right MOOCs, the SMT agreed a process whereby those Schools proposing a MOOC for development had to indicate how it would contribute to one or more of the University's strategic agendas namely student recruitment, research, outreach and community engagement, international engagement, reputation and branding and learning and teaching.

Overall, MOOCs proved easier to produce and operate than we had expected and much easier than our fully online degrees. The marketing was 'taken care of' by the MOOC platform holders plus our own targeted media activities. Of course, these were much smaller educational offerings and less demanding on learners and many learners decided not to complete the course they had signed up for, which comes at a cost for fully-registered students on degree programmes. For academic staff and tutors there was a definite 'fun element' in finding out how many people would sign up, getting new and interesting discussions with learners with very different backgrounds and viewpoints to on-campus students and the assessment burden on them was low as almost everything was automated. We were pleased that so many Schools wished to produce MOOCs, as in the beginning it wasn't clear if the first early adopters would be all who would come forward.

The return on investment was much greater than we could ever have expected when we made the decision to join Coursera and even after four years, with the media interest declining, it is still good. By late 2015 we were able to identify a substantial number of returns on our investment (RoI) in MOOCs that went well beyond the small six-figure sum we had earned from certificates. We consider that the monetary value of the positive publicity that we received was many millions of pounds and the overall RoI was very much larger than we had expected.

The external RoI included: impact in political and policy-maker circles; wider public awareness of the university as an educational innovator, including, importantly, amongst incoming students; research grants earned and research disseminated; publications (textbooks, book chapters, journal articles); consulting on online education with third parties (including influential NGOs); new national and international partnerships and reinforcement of some key existing partnerships; strong public engagement; and many invited lectures.

Internally there was substantial increase in the understanding, capability and capacity for developing online education, which resulted in some new online Masters degrees from Schools that had not previously shown an interest and a new stream of MOOCs; re-use of MOOC content in other courses; and increased PhD recruitment, thus adding to our research base and creating a fee income stream.

At the end of 2016 we were offering MOOCs on three commercial platforms (Coursera, FutureLearn, edX) and had reached over two million registrations and awarded 150,000 certificates to learners from 200 countries. We appeared to have reached our goal of providing good quality courses, as the feedback data showed very few who replied had not enjoyed the courses. We had created 40 MOOCs

with over 800 videos (by the end of 2019 there will be 50) which has involved 130 academic staff and 130 tutors from 19 of our 23 Schools. Clearly our initial cautious venture into offering six MOOCs in 2012 grew enormously! Interestingly, some of the Schools that are the highest providers of online degrees do not make MOOCs and some of the Schools offering MOOCs do not offer online degrees, but the great majority of Schools do both, as only two Schools offer neither MOOCs nor online degrees.

The MOOC Team and its leader Amy Woodgate had been recognized with the award of the 2016 Principal's Medal for their contribution to the University's success in creating a large number of excellent MOOCs.

Lessons learned

For opportunities with high uncertainty as to the scale, duration or outcomes, an incremental approach works well. MOOCs did not need a defined, multi-year programme with specified funding, but instead agreeing a first phase (six MOOCs) and a modest investment out of the annual planning cycle let us prove feasibility and put forward a costed plan for the next year within the planning cycle. Each year thereafter we could plan for a small number of years ahead and specify the level of investment that we were prepared to make.

A light and fast governance process can be used for out-of-the-blue opportunities, but only if it is one that still relies on the basic principles of approval, accountability and responsibility, risk assessment and cost– benefit estimations, and ensures engagement of key academic and support service staff. Being able to point to the approval of governance bodies gives legitimacy in discussions with leaders of Schools and service units.

In contrast to our on-campus and our fully online degrees, for our MOOCs we outsourced the technology to the MOOC platform provider Coursera. The uncertainty as to the long- (or even medium-) term future of MOOCs reinforced this decision. We actually got a less well-developed eLearning and assessment system than we already had, but it gave us valuable attributes such as design for large scale simultaneous use, high visibility marketing and benefits from multimillion dollar investment in the company from external sources. It also later allowed us to use simultaneously three different technology platforms from three different providers, with consequent pedagogical diversity, which we could not have done ourselves. The decision to outsource the MOOC platform was aligned with our university view that when useful and legal we would outsource non-core skills and services.

CONCLUSIONS

The two initiatives, DEI and MOOCs, have been successful in their own ways, however our online education is still fragile. It is not yet deeply embedded in everyday academic thinking about what degrees or courses to offer, and the level of activity still makes it a minority interest. Nor is it embedded in the thinking of all senior staff and so online education could wither away without continued nurturing, even after so many years. Changes in the SMT could still halt or reverse the progress that has been made.

In part, this limit to expansion of fully online education stems from our decision that the University will primarily remain a residential university, albeit strongly supported by and reliant upon, technology. Furthermore, we have yet to take the step to link MOOCs directly into the mainstream of credit-bearing education (although some pilots are being developed of MOOC-degree hybrids) and we

have not yet produced hybrid degrees with a portfolio of courses (modules) that can be taken online or residentially at the student's choice. The two developments would add significant embedding to our current online education.

Reviewing the period of systematic development of use of technology in degrees and courses at the University of Edinburgh, dating from around 1990, I can see several key lessons that could inform decision-making at other comparable universities. (I use the term 'comparable universities' intentionally, as HEIs with a very strong central command-and-control model of governance and management or with very strongly devolved authority to the point of almost independent academic entities (Schools/ departments/faculties) under a single university name, will find that some of these lessons have to be highly adapted or are not applicable at all.) These lessons are:

1. A consistent vision is needed over a long period. How should the university approach educational innovation; what is its risk appetite in this area? Does it wish to be viewed as a leader, a mainstream adopter or is it promoting a vision of tradition that minimizes innovation and change? For universities with long-term senior staff appointments, this is not so difficult, but where senior staff change on a short (3–5 year) timeframe, getting the vision written into long-range planning documents and targets, and into the minds of a top-level University Court or Board with external members, can help embed it.

2. Embedding takes time, mainstreaming major change can be a slow process, and we should note John Kotter's comment on not celebrating too soon but making sure we reward our teaching and support staff for success as we go along (Kotter, 1995). Educational innovation can run counter to the views and desires of many existing academic staff so we need to be prepared for slow burn, for some re-design and some re-thinking, towards the same endpoint.

3. Change needs leaders – Senior Responsible Officers – who can be guided by committees, but committees themselves cannot act as the drivers nor the agents for innovation. Committees are essential ingredients for ensuring quality and adherence to procedures, of good practice, of good governance, but for educational change projects, senior individual authority and responsibility with strong oversight is essential. Senior staff can be held to account – committees cannot.

4. Understand the difference between major strategic projects and minor projects and allocate governance processes accordingly. Senior level buy-in, off all the main actors in the equation, is needed. For many projects, leaders of academic Schools or Faculties are key. If possible, try not to affect all of them simultaneously and work from the most in favour to the least. 'Big bang' is not an ideal approach. Use the peer status of those engaged to help those not engaged to re-think their position.

5. Trust, trust, trust. All educational innovation is a gamble to some degree, some more than most (perhaps why many universities were wary about MOOCs for several years). Shared leadership depends upon trust, between those in the most senior and the most junior positions in the organization. Actions and not words, over years, are what count.

6. Return on Investment (RoI) is a new concept for some universities but we have found that it makes a real difference to major project business cases and evaluations. RoI is not just about money; it can be new partnerships, wider influence, better student outcomes, higher satisfaction levels, capacity to scale up, and so on. Often, external members of university Courts/Boards tend to understand this approach better than we do.

We have found our 25-year journey into digital education to be demanding but also highly rewarding, and it is a path I hope continues without end. Hopefully the lessons that we have shared here will be of value to others on the same path.

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