How should professors adapt to the changing digital education environment?[1]

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Introduction

Pedagogic innovation is increasingly important as academia[3] tries to respond to an economic, social, cultural, and technological environment that changes almost too quickly for our education systems to keep pace. Professors and lecturers have to negotiate responsive curricula that will not date by the time their students have graduated, and have to teach in a way that enables larger student populations to have a high quality educational experience with high level learning outcomes. Achieving both wider access and higher quality in an economically constrained sector presents a real challenge.

To achieve this professional miracle we should reflect on the nature of our professional activity as teachers. First, we have to recognise that teaching is in not the transmission of acquired knowledge; it is better to see it as a 'design science'[1]. We have to problematize teaching itself, and take an iterative approach to discovering and testing how to make student learning as effective as possible.

Second, we have to exploit to the full the capabilities of digital technology if we are to achieve the difficult task of producing larger scale and higher quality learning.

This chapter addresses the question of how professors should adapt to the changing education environment. The title implies a potentially radical shift in the nature of HE, so the argument begins with our shared fundamental beliefs about the aims and purposes of higher education. We need a clear sense of purpose when such powerful forces of change are at work. To avoid being technology driven, we must learn to harness technology as the means to serve our academic ends. This is a dramatic shift in the role of the professor. The changes in HE in the last few decades have not been led by academia, nor by students, but by policy and technology. It is not wise to be content with that, because these forces have no interest in academic values and priorities.

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[1] Chapter 1 in *Emerging Models of Learning and Teaching in Higher Education: From Books to MOOCS?*, E. De Corte, L. Engwall, and U. Teichler, Editors. 2015, Wenner-Gren: Stockholm, 2015.

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[3] Used in this chapter to mean the internationally recognized establishment of professional scholars and students

The future of academe is not at all secure - who else but professors should lead the adaptation that must happen when the environment changes so radically? The moral compass that guides us should be our own.

'From books to MOOCs', and back to a book: it would have been appropriate to turn this book into a MOOC, but we maintain some of our traditions because they work well. The Academia Europaea's three-day conference brought together a disparate range of academic perspectives around the single issue of the MOOC. There was time to argue and interrogate, and this enabled ideas and thinking to shift and re-form. The book itself will shift and re-form, and its contents will some day turn into resources for other courses, online or not. There is no need to abandon this diversity, and every reason to maintain it. So the principle message of the book is to enhance the current diversity in academia by pursuing the idea of a MOOC until it fits with our academic aims.

The aims and purposes of HE

Every university now has a mission statement that defines its identity and role as an institution, so this is a useful place to look to discover how academia views its aims and purposes.

In our roles as 'Thinkers in Residence on Blended Learning' for the Royal Flemish Academy, Pierre Dillenbourg and I visited all the Flemish universities to see how their ideas were developing, in relation to their mission [2]. In every case the mission statements had strong ethical values informing their approach to teaching: to enable students "to assume their social responsibility as committed citizens" (University of Leuven); "to widen participation, addressing all talents" (Hasselt University), to connect staff, students and alumni "by our common values commitment, openness and pluralism" (Ghent University); offering "applied research … with an outlook on Europe and the world" (Vrije Universiteit Brussel); an academic community "able to contribute to the well-being of our society… (University of Antwerp). The wider reach and the contribution to society are common to them all.

I had an earlier opportunity to think this through, as a member of the UK's National Commission on Innovation in HE [3]. We were enjoined to leave behind the analysis done by the Robbins Report [4], and start afresh in our analysis of the aims and purposes of HE. We did so, diligently, but came up with exactly the same four types of aim: personal, knowledge, economic, social:

> **Personal** - to inspire and enable individuals to develop their capabilities to the highest potential levels throughout life

> **Knowledge** - to increase knowledge and understanding for their own sake and foster their application to the benefit of the economy and society

> **Economic** - to serve the needs of an adaptable, sustainable, knowledge-based economy at local, regional and national levels

> **Social** - to play a major role in shaping a democratic, civilised and inclusive society.

The wording changed a little, but the main difference was the ordering: in 1963 they put the economy first; in 1997, after 13 years of Thatcherism it came 3rd. A second important difference was to change the social aim from "transmission of a common culture" to "shaping a democratic, civilised and inclusive society", in recognition of the much more diverse society we had become.

Overall, these were summarised as "The aim of higher education is to enable society to make progress through an independent understanding of itself and its world", where every word is an element of the nature of HE, in *enabling* through both research and teaching, making a contribution to *society*, that is *progressive*, informed by an *independent* perspective, that is based on an *understanding* of both *the world,* both social and the natural. Such a guide can help us negotiate the successive waves of innovation, keeping the compass firmly set on our true goals.

If MOOCs are the solution, what is the problem?

The impact of MOOCs came as a surprise to many of us who had been in the field of open online education. There was nothing new about open online courses, as open universities had been doing this since the arrival of the web. There was nothing new, even about their large scale. The British Open University's first online course in 1994 had over 10,000 students, in spite of the fact that although it was open to all, it charged the normal course fee, and lasted some 30 weeks. There was no innovative pedagogy: MOOCs used video lectures of mostly talking heads, general discussion forums, multiple-choice quizzes, and peer assessment. The OU used BBC filming, tutor-guided forums, interactive media, and tutor assessment. Why the excitement about MOOCs?

There was the original phenomenon of the massive take-up of a single course – explicable because it was on artificial intelligence, and anyone interested in AI will be an early adopter and on the web; it was given by a famous academic; and it was free. The California universities moved speedily to promote this as a new model, and to act to make it so by building the platforms to support it. The numbers were the key – 150,000 students on one course allowed the venture capitalists to see a business model in which, as Coursera's Daphne Koller suggested, 100,000 students paying $50 each brings a respectable return[4]. So the MOOC had the numbers that drew the attention of the media, and enabled the speculation that because these courses were large scale and 'free', they could educate the world.

That is an exciting thought, given the aims of HE. Since that time, when 2012 was dubbed 'the year of the MOOC', we have had the opportunity to examine this claim, now that, thanks to the energy and innovation in the universities involved, we have a wealth of instances and data.

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[4] Goldman Sachs Higher Education and Technology Symposium, 29 Nov ember 2012, Goldman Sachs, London.

It is clear that MOOCs are not yet educating the world. Of the 7m students on Coursera MOOCs 85% already have a degree. Only 4% are from Africa. And the emerging markets, where we might expect the greatest take-up, only contribute 37% of students. MOOCs are not solving the problem of how to educate the world.

MOOCs provide the solution to the problem of how to provide free education for highly qualified professionals. This is not a problem we had ever identified, especially in the context of high levels of debt among the students at many universities in the US and the UK.

In their current form MOOCs fail the test implicit in the ethical values of academia – they do not achieve a wider reach, and they do not contribute to society as a whole. They do not come close to the early claim to educate the world, and given the lack of pedagogic quality that does not even meet the standards of open education in the 90s, they are not on track to do so. They have even attracted investment from the universities taking part in MOOCs, which could have been directed at technology innovation for their own students, and which instead is used to create free education for people who could easily pay.

On the other hand, from the point of view of those of us who see learning technology as the key to the future of academia, MOOCs have had some important effects. They have attracted investment from venture capitalists into online education, brought online education onto the HE strategy agenda, and persuaded the most innovative professors to take an interest in the wonderful gift of digital technology.

Technologists, rather than educators, have specified the capabilities of MOOC platforms, so they are very deficient in pedagogic terms – not one of them supports collaborative learning, for example. But the great benefit is that they operate at scale, and provide easy access to data on student behaviour, in a way that Virtual Learning Environments do not. So potentially, this technology could cope with educating the world, and could track our success in doing that effectively. The potential will only be fulfilled if the platforms support the pedagogies and the learning analytics we need, which at present they do not, but it is the responsibility of the academia to drive these developments, because the technologists cannot do it alone.

University strategists have been forced to come up with respectable reasons for spending millions on innovation that should have been directed at their students, and this has generated a strategic focus on our fundamental ethical values. Open online education can now be seen as important for

1. Bringing these online innovations into our campus courses
2. Marketing our online and campus courses
3. Pro bono contributions to society
4. Engaging reluctant academics in online teaching

For the open education community these strategic opportunities are an extremely valuable impetus for the investment we need in learning technology. And the innovative professors now recruited to the cause will be powerful lobbyists for the pedagogic developments we need.

MOOCs are therefore also the solution to the problem of how to promote the cause of open online education.

The MOOC as professional development

What does this analysis mean for the role that professors should play in the way forward for MOOCs? The technology has potential, and we should welcome that, but we have to work out the best way to exploit it for academic aims.

Technology works best by responding to the most challenging problems, and education has plenty to offer. By 2025, the global demand for higher education will double to ~200m per year, mostly from emerging economies [5]. 1.6m new teaching posts are needed for universal primary education by 2015 [6]. Could HE "play a major role in shaping a democratic, civilised and inclusive society" by helping to meet these challenges? Our current model, even in the successful large-scale open universities, is to support students using a roughly 1:25 staff:student ratio because that is the nature of the nurturing and scaffolding education must provide to enable them to achieve capabilities they do not initially even understand. Education is not a mass consumer industry; it is a client-centred industry, more akin to the law and consultancy than to the supermarket. But how could technology help?

MOOC pedagogy does fit well with continuing professional development (CPD). In CPD we typically provide some form of updating on current issues and findings, invite participants to discuss and debate the application to their professional contexts, and then offer a certificate of attendance to put towards their professional development requirements. It is a perfect fit with the capability and the demographic of the current MOOC.

This could also fit with our long-term goal to educate the world. UNESCO demonstrated the need for a vast increase in the number of primary teachers if we are to provide universal primary education. So we decided to test whether we could contribute to meeting this challenge by designing a MOOC for teacher professional development.

Collaborative learning for professionals: the case of primary teachers

The occasion for this was the opportunity to use research on ICT in primary education, funded by UNESCO, for a series of books. By redeveloping the findings as a MOOC we could engage a much larger number of primary teachers in these new ways of teaching. However, although the research was based on case studies and surveys from 19 countries, the research needed to be contextualised by local teachers to ensure its relevance for the much wider range of countries and educational contexts across the world. Our approach was to design this as a collaborative learning course, so that teachers could learn from each other, and we could learn from their responses to the findings[5].

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[5] https://www.coursera.org/course/ictinprimary

It was a niche course, for a particular profession, a particular sector, and for those with an interest in ICT. Nonetheless, it recruited >9000 participants, from 174 countries, 75% being teachers, leaders and policymakers in primary education, and 25% from further and higher education. The demographic was similar to the Coursera average as 89% already had a degree. It attracted 7% from Africa (compared with the average 4%), and 44% from emerging economies (compared with the average 37%).

The pedagogic design

Most MOOCs have had disappointing numbers of students taking part in the discussion forums, as low as 2-3% of the cohort. Given our focus on collaborative learning it was essential to find ways of increasing this.

One technique was to set up discussion forums that were specifically targeted on an issue raised in a video or reading, and ask participants to focus their contributions on this, and to relate it to their own local experience. This gave the teachers the opportunity to exchange these experiences and so share and build on each other's ideas. We also linked this to a Course Journal – the format was their own choosing, allowing them to use an existing e-portfolio or blog, or just to set up a document to record ideas and plans. The aim was to keep bringing the generalities of the course back to the specifics of their own teaching, or school context. Figure 1 shows an extract of this sequenced study guide.

Watch the audio-slide presentation on Types of Learning and Learning Technologies. This talks through the 6 types, then links each one to what we saw in the video. The final slide, asks you to interpret these types of learning with technology for your own context.

Complete the table in the document ICT and types of learning about [topic] to show how different types of ICT could be used in your own teaching. Or, if you don't teach, suggest a way you would like to see it being used in a school to support all the different types of learning for the children.

Record these ideas in your Course Journal.

| Activity 1.2.3 How would you use technology for primary teaching (Optional) | 30 mins |

Select one or two of your ideas for using ICT in primary teaching from Activity 1.2.2.

Post them to the Forum: 'Ways of using ICT to elicit different types of learning'. There is a thread for each type, and one for 'General comments'.

- Learning through **acquisition** - how would you use ICT for this?
- Learning through **inquiry** - how would you use ICT for this?
- Learning through **production** - how would you use ICT for this?
- Learning through **collaboration** - how would you use ICT for this?
- Learning through **practice** - how would you use ICT for this?
- Learning through **discussion** - how would you use ICT for this?
- General comments

Read through the comments others have posted, and comment on any you find useful, or if you can suggest a way of making it even more effective.

Figure 1: Extract of the study guide, including the Course Journal, specific forum topics, and suggested timing given for each activity.

MOOCs do not naturally support collaborative learning so we had to develop these activities using tools external to the platform. A Diigo site[6] was set up to create a

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[6] https://groups.diigo.com/group/ict-in-primary-education; https://www.diigo.com/about

community repository of useful resources and tools relating to ICT for primary education. The teachers were encouraged to explore sites within their language group or country, or topic of interest, post a useful link, tag it with relevant keywords, and look at sites posted by other participants. Altogether over 300 useful resources were posted.

They were also invited to use a Padlet wall to share links to tools and resources that were useful for the specific new challenge for primary teachers, to introduce their students to computational thinking[7]. The wall provides a visual collection of all the links posted, which were then discussed within a linked forum.

Evaluating the pedagogy

Overall the course was highly rated, with 84% rating it very good or excellent (compared with the 68% London average).

There was clear evidence in these forums of a group of participants who were highly engaged with each other and with the issues at stake, comparing their experiences, commenting on ideas they could take from each other, and discussing the barriers they would meet. This was in contrast to most generalist MOOCs, which have a much broader range of competence and experience in their students. For example, the University of London report on its first four MOOCs showed the disappointingly low 2-3% forum participation rate in the final week, in common with most other MOOC reports [7]. For our professional development course the learning analytics data extracted from the Coursera platform showed that 39% of those still active in Week 6 were contributing to the forums [8], ten times the proportion of the larger but more generalist MOOCs.

The high level of engagement may also have been influenced by our study guide approach, and especially the timing of activities, which is unusual for MOOCs. Usually they simply list the resources, with no timing, and embed any guidance within each one. We tested this in the post course survey, which explicitly asked participants to rate their preferences for and against such an approach: 56% preferred to have a guide; 4% preferred not, which is a very clear indication of preference for guidance, even from this highly professional and experienced group.

The collaborative learning exercises based on the external tools and resources, together with the community of participants generated by the course, all received approval ratings of over 75%, in terms of scores on a 5-point scale.

We concluded, therefore, that for these teachers the pedagogy of guided collaborative learning was viable and productive. The design features appear to have effected a significant improvement in comparison with the more typical MOOC design, although a significant difference is the greater homogeneity of the cohort, which could account for this.

However, the test was a success in that it demonstrated that it is possible to contribute to meeting an educational challenge by designing a MOOC for teacher professional development.

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[7] http://padlet.com/wall/ho8667b77501

Problems for which MOOCs are a solution

There is considerable evidence that MOOCs are already providing professional development of the more instructivist kind, given that the most popular MOOCs are in computer science and finance areas, and the dominant participants are US-based male professionals. There is now some evidence that MOOCs could provide collaborative professional development for teachers on the large scale.

This need not be confined to teachers. The problems for which MOOCs are a solution could be characterised as *those that need collaborative online professional development on the large scale*.

MOOCs therefore provide a solution to one significant challenge that all top universities face: to achieve research dissemination and impact on the large scale. The research professors in every major university must do this to preserve their track record and gain further funding. The non-academic beneficiaries of their research will typically be the professionals who need to know the latest findings and how to embed them in everyday practice. In human systems, less so in computing and finance systems, the local context requires careful implementation of an innovation, whether for cultural, economic or logistical reasons. So collaboration, rather than instruction, will be a more fitting approach.

The particular value of a collaborative approach is that the course team learns as much as the participants. The innovation may come from the research, but the co-construction of innovative practice is essential if the rollout is to be effective for the end-user. And the participants' constructions – of designs, or action plans, or procedures, etc. – become resources for the next run of the course, enabling the professional community to build *practitioner knowledge* through the collaborative MOOC, in parallel with the research community building *formal knowledge* through the collaborative process of academic scholarship and peer review.

A new model for professional development

We can now propose a wholly new approach to professional development that could be significant particularly for the complex human and organisational systems that can be so resistant to embedding research in new practice:

> *the issue of implementation and adoption is of critical importance and one in which education research in general has had a very poor record.* [9, p18].

Educational systems are especially vulnerable to this typical trajectory of innovation and change:

problem – solution – pilot – local refinement – rollout – engagement fades – problem

The schools in the pilot stage have high engagement in the development of the solution, contributing to its form, and retaining a sense of ownership. But the rollout is a one-to-many dissemination that cannot so easily engage every recipient in the local refinements the other schools need. The top-down transmission of a solution fades in its impact and the problem remains. This traditional difficulty of bridging the gap between the research lab and the complex environments of multiple classrooms was identified by Ann Brown's classic paper on design experiments: "successful

interventions are a chimera or at least are extremely fleeting and fragile, not readily transportable to settings outside the innovator's control" [10] p171.

One of the most impressive discoveries made by open education, and MOOCs in particular, is that these courses demonstrate that we can *drop the pilot - go straight to rollout*. Educational interventions have typically taken the cautious approach of testing on the smaller scale first, but large-scale courses go straight to the large scale. Perhaps educational interventions could do the same, and take an alternative approach to innovation and change:

problem – solution – rollout – local refinements – engages local solutions

This bypasses the pilot and effectively treats all schools as experimental, expecting the end users to engage directly in the testing and refinement of the 'solution', and thereby engage directly in transferring research findings to practice.

The approach avoids the problem that afflicts any attempt to take the western countries 'solutions' into locations where they are inappropriate and intrusive. The collaborative, co-constructive approach that a professional development MOOC offers would at least improve the likelihood of the innovation being workable at local level. This applies not just to education. Any other professional area that has to recognize the complex systemic nature of human and organizational contexts, such as community health, agricultural practice, climate and the environment, and many others, needs a similar approach.

The University's moral imperative

There was a thread of discussion running throughout the Academia Europaea conference, reflecting the Academia's (the general shared ethical position that it has a moral imperative to develop a wider reach in its contribution to society. Open education has demonstrated that it can achieve that wider reach; MOOCs have taken the potential to a new scale, and to a new level of diversity of cultures and countries, if not yet educational level.

One of our big challenges is how to reach the children who need good primary education. Clearly the MOOC does not solve that problem directly, but it is possible now to see how the wide reach of technology could reach them through a network of professional development. Here is the argument:

1. Our 8-person international course team for the ICT in Primary Education MOOC reached over 1200 teachers in Low-Income Countries.
2. A less niche course on Primary Education, with targeted marketing, could certainly provide collaborative professional development for 8000 teachers and leaders in those countries, working at national level.
3. To generate the network of development, each of these teachers could work locally to engage 25 regional teachers in collaborating on using the course resources to develop improved localised classroom methods at regional level.
4. To reach the children in need, each of those regional teachers could then set up support groups of 8 adults in villages, townships and communities, working together to develop them to become effective local teachers

5. The MOOC provides resources and online community support to the regional teachers, who in turn provide the support the local teachers need, whether or not they can access the online resources.

This multiplies up to 1,600,000 teachers. The large-scale technological capability is only needed at the first stage. After that the local systems can be used, making use of the cascaded resources and ideas. However, for the collaborative approach to be preserved it is important for the localised solutions to pass their ideas and experiences back up the chain. This is the kind of co-learning that is now recognised as much more likely to be successful than dissemination of teaching innovation via "the traditional "master" role of teacher educators" [11] p18.

Increasingly some of the most challenging contexts - remote rural areas, urban slums, and border cities – are beginning to have access to mobile devices and connectivity. It is not the technology that makes it difficult, but the organisation and support for the human systems in the network. In the urban slum areas, for example, adults set up their own private schools where there are too few government schools, but they are unofficial, so have no support or access to professional development. Providing this kind of support could now be affordable, but would still have to overcome the political barriers.

This is where digital technology could make the critical difference by offering the means for collaborative professional development. The two-way communication and sharing of designs, products, and localised solutions, is a way of building professional knowledge of effective practice. This is not the typical trajectory of pilot – rollout – fade.

It is worth asking, for any big challenge, '*how can technology help?*' because digital tools and environments operate on the very large scale and vastly increase efficiency and reach. MOOCs are an opportunity for academia to think through how such technologies could serve our moral imperative to achieve a wider reach and greater contribution to society. A new model of collaborative professional development is one way to do that.

The problems we have yet to solve

MOOC platform pedagogy

There is some way to go before MOOC platforms develop the capabilities we need for the most effective pedagogies. The US-based platforms support an essentially instructional approach, while the European developments, such as the UK's FutureLearn[8], support an explicitly social learning approach. None support collaborative learning [1, see Ch 11], which would orchestrate participant groups through collaboration - practice, production, and discussion activities - based around both on-platform and off-platform tools.

Some chapters in this book document these pedagogical requirements, where academics wish to take the successful action learning pedagogies into the digital

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[8] https://www.futurelearn.com/

world[9], or to improve the quality of automated feedback and assessment methods[10]. As Ton de Jong pointed out in the final panel discussion, academics also want to embed the sophisticated off-platform interactive tools they use[11].

Technology challenges are always solvable, and these are the easy ones in comparison with those already solved by MOOCs (e.g. peer grading on the large scale, large-scale discussion forums), but they still need investment. Unfortunately, while these new platforms have attracted major investment funding, the design has not been driven by the educators, but by what the technologists believe educators need. There is a great danger that having invested so much to get this far the investors will demand a return before we get to the point of developing systems that are fit for purpose. Educating the world takes more than talking heads, quizzes and low participation forums.

The MOOC business model

The greatest barrier to developing a viable business model for MOOCs is that universities do not understand the cost-benefit models applicable to traditional teaching, and have even less idea of the much more complex ones needed for the blend of online and campus education [12, 13].

The debate about tuition fees continues, and there are very different solutions in different countries. Returning to the fundamental aims of HE, one is to "inspire and enable individuals to develop their capabilities to the highest potential levels throughout life". Clearly, therefore, the HE business is nothing like a mass consumer industry, and a MOOC is not a digital good that can be distributed on a fixed cost basis. Education is a client-centred industry, which invests in individuals for the contribution they will make to the economy. There is therefore both a private benefit and a public benefit[12]. As we plan our investment in the future of education it is essential to track the relative changes in these proportions, and adjust student fees accordingly, whether campus or online.

But the fees charged should be related to the cost in order to be sure we achieve break-even. However, traditional costing of teaching has made broad assumptions dependent more on historic distribution of top-down budgets than on any bottom-up activity-based costing of how teachers spend their time and to what end.

In the migration of courses from campus to online, there are many shifts in cost structures. The fixed costs of preparation can be distributed over very large numbers, and repeat runs. The variable costs of supporting each individual student dominate the costings when numbers are large, and can lead to step changes in volume of workload for both teaching and professional staff, while generating much larger incomes. The developing of online courses is highly labour intensive for the first run, less so for the second, and thereafter can run on a fairly stable basis of

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[9] For example, Chapters by Karlsson and Janson, Cusamano

[10] For example, Chapter by Haywood

[11] For example, the Go-Lab Repository for remote and virtual laboratories: http://www.golabz.eu/

[12] See also Chapter by Brown

regular updating until a wholly new course is required, and may not break even until the 3rd run, after which they may be much more profitable. All these factors put online courses into a radically different costing structure, in addition to the quite different combination of advantages and disadvantages they generate for the student learning experience [14].

MOOCs, especially those for professional development, should certainly be able to charge the level of fee from sufficient numbers of participants that would enable break-even model to be achieved after 2 or 3 runs.

However, the second greatest barrier is the public perception, fuelled by the promoters of MOOCs, that 'content is free' when it is online. We have learned to expect digital goods to be free[13]. This is a disaster because it is not. MOOCs have no future if they have to rely on academics working for free just because the numbers are large.

A MOOC is a client-centred transaction with an implied contract that defines the roles quite explicitly – the course team will enable the participants to achieve the intended learning outcomes. So the quality of the transaction has to be improved until it achieves the quality of service they need. The fulfillment of the contract is the credit – and this is very labour intensive. For professional development the minimalist 'certificate of attendance' is acceptable, but not for degree level qualifications at undergraduate level.

The platform capabilities and the business model are interrelated, and both are hard problems that still need a lot of investment.

Conclusion: What should be academia's response to MOOCs?

Let us keep in mind the fundamental aims and purposes of HE, for example '*to enable society to make progress through an independent understanding of itself and its world',* in terms of the personal, knowledge, economic, and social benefits it confers. We need such a compass to guide our direction of future travel.

From this discussion it follows that academia has a moral responsibility to:

- make our ethical rhetoric a reality

- lead the changes in educational practice that are needed for this

- model the learning benefits and teaching costs of HE that make this viable.

Academia's response to the wonderful gift of digital technologies for education should be to:

- seize the opportunity to educate on the large scale

- understand the true value and nature of MOOCs to use them well

- orchestrate the transfer of evidence-based knowledge to practice that makes an impact.

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[13] See also Chapter by Cusamano.

And then perhaps we really will be able to educate the world.

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