The Changing Pedagogical Landscape

New ways of teaching and learning and their implications for higher education policy

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– New ways of teaching and learning and their implications for higher education policy

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Common Abbreviations

CPD	Continuing professional development
ECTS	European Credit Transfer and Accumulation System
ENQA	European Association for Quality Assurance in Higher Education
ESG	European Standards and Guidelines in the European Higher Education Area
HE	Higher education
HEI	Higher education institution
ICT	Information communication technology
IQA	Internal quality assurance
IT	Information technology
LLL	Lifelong learning
LMS	Learning management system
MOOC	Massive Open Online Course
OER	Open education resource
QA	Quality assurance
QE	Quality enhancement
TNE	Transnational education
VLE	Virtual learning environment

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Executive Summary

The Changing Pedagogical Landscapes study took place from January 2014-June 2015 and was designed to address the following objective:

"to examine to what extent government strategies and higher education regulatory and accreditation, funding, quality assurance, assessment and certification frameworks support or hinder new modes of learning, and in particular increased use of technology in the teaching and learning process. The research should further formulate conclusions and recommendations on how these systems – the framework conditions for higher education - can best be tailored to support new modes of teaching and learning."

European higher education has a long history of providing high quality degrees and advanced training in a very wide range of subjects, and has expanded its capacity greatly over the past 50 years. The use of qualification frameworks, quality assurance processes, mutually-recognised awards and credits, and support for student and teacher mobility have led to a sophisticated and sought-after higher education system. However, in common with all developed countries, there is concern that uptake of ICT in teaching and learning and innovation in pedagogy are still insufficient to enable the degree of flexibility and accessibility that will be needed for national economic success and the personal fulfilment of citizens. This study was commissioned by the European Commission to provide research analysis for, and recommendations to, European governments that would aid them in promoting greater innovation in pedagogy and in the use of technology in higher education.

Desk research was carried out into worldwide developments in pedagogies and the use of technology in higher education and in-depth studies conducted, with the help of experts, in eight European countries (France, Germany, Lithuania, the Netherlands, Norway, Poland, Spain and the UK). These countries were chosen as being representative of the range of ways in which higher education is funded and quality assured, the mechanisms used to promote innovation in the curriculum and increase uptake of ICT in university teaching and learning, and the presence or absence of such innovation in their universities' activities. The research involved an analysis of the policies of these countries towards innovation in the use of technology and pedagogy in higher education, and the investments that had been made over recent years. Interviews were undertaken with key informants in government, national and regional agencies and a small number of universities to assess their views with respect to this agenda and what opportunities and barriers existed in each country. A Delphi study was performed to gain an insight into the thinking of European university staff with good experience of innovation in pedagogy and the use of technology. They offered their views on the reasons to modernise higher education, the measures that would be useful to track change and benchmark, and the likelihood of different future scenarios for the European higher education system.

In all of its work, the research team was seeking evidence of where barriers to innovation in higher education teaching and learning still exist at system level, and what sorts of developments have supported or facilitated change. This study is one element in a programme of work that stems directly from 2011 European Commission communication "Supporting Growth and Jobs: An Agenda for the Modernisation of Europe's Higher Education Systems" (EC, 2011).

The final report of the study has six sections: an introduction; a review of change and turbulence in the higher education system; in depth studies of barriers and developments in curriculum design and delivery, in quality assurance and in funding regimes, and it concludes with the study's Recommendations for immediate action at European and national levels. There are 4 Appendices containing detailed sub-reports.

The **Introduction (1)** reviews recent changes in higher education with particular reference to innovation in pedagogy and technology, but also reflects on the shifts in student populations towards less traditional learners and the increasing importance of lifelong learning/advanced training and of open education. There has been uneven progress in Europe towards agreed national targets for higher education provision and access, especially during the period of the recent recession (EC, 2010; EC, 2015b). Member States manage their HE provision differently, from high devolution to relatively tight state control, and so generalisations about how (operationally) to make progress towards a more modern higher education system are difficult to offer. At European level recent reports and action programmes have taken place (EC, 2013, 2014), designed to stimulate greater use of technology and innovation in pedagogy. However, policy levers act far above the chalk-face, for example the goal of more student-centred learning can be agreed by Ministers of Education at Yerevan (EC 2015a) but it requires them to find ways to make change happen in curriculum design and delivery in very many universities and colleges. These changes must take place whilst still maintaining, and ideally improving, existing teaching and learning quality.

Although there are good data on the extent of uptake of ICT in higher education, and in the development of infrastructure (SURF, UCISA, Norway's ICT Monitor) and from these it is clear that much work has taken place, change in pedagogy is much less well understood and documented, and often anecdotal. At present it is probably true to say that technology is used within and alongside largely unchanged pedagogical approaches. There was no evidence in the literature, nor in our case studies, that suggested that traditional universities were offering the majority of their Bachelor or Master degrees in formats that would enable students to study at a distance (e.g. online) or to vary their rate of progression, nor to be able to study in different modes at the same time. The websites and prospectuses of almost all European universities confirm this finding. Although innovation is taking place very widely across Europe, it still forms a very small fraction of total higher education provision.

The higher education landscape is also complex: there are three cycles of degree provision, many universities and colleges offer continuing professional development (CPD) and lifelong learning, and open education has "come of age". Higher education is no longer solely for national citizens, with both intra-European student mobility and, in some countries, transnational education for those outside Europe, which is becoming an increasingly important part of the economy as an "education export".

The **Turbulence, disruption & the European higher education system (2)** section reviews the evidence that supports the proposition that major change is impending for European higher education. The signs of this change can be seen in the wide range of "experiments" being carried out across the world into novel forms of higher education. These include: competency-based education; a diminution of the need for learners to spend defined periods of time to achieve credits; the growth of MOOCs and other open education; a continuing expansion of online ranking and rating systems for universities, courses and professors; the expansion of public-private partnerships in online education, and some unbundling of the traditional end-to-end

higher education process (Weise, 2014; BIS, 2013). These are evaluated in the light of the Christensen model of innovative and sustaining disruption (Christensen, 2013).

Although the Delphi experts did not generally foresee radical change taking place within European higher education in the next 10 years, i.e. the disruption proposed by some writers, they did anticipate substantial modification of the existing system, with more online learning, more open education and greater flexibility being introduced. To ensure that European higher education is capable of adapting to these changes, and is sufficiently flexible and agile to grasp the opportunities and manage the pressures, a robust and regular dialogue is needed between the key stakeholders in the higher education system in each country.

In the **Curriculum design and delivery (3)** section the progress made in higher education to innovate in pedagogy, and to expand its use of technology, is evaluated. It is clear that the learning management system (LMS) has supported the introduction of a large component of technology into the curriculum in all universities, notably in those visited in this study, but at the same time it has often resulted in limitations to the range of innovations to those that the LMS could support, and it has often become an end in itself. However, in the past few years the range of new technology applications available has expanded greatly, as has the amount of high quality digital content, and so alongside that LMS-constrained environment has been substantial experimentation and innovation.

Technology is now widely accepted as a normal part of university education, by both students and teachers, and is seen by many as the solution to problems such as scaling up with limited funding. The adoption of MOOCs and fully online education by high-ranked universities has reduced the negative view of technology in higher education. To support these changes, most universities have "eLearning centres" of some kind, with professional "learning technologists/instructional designers" who work with teachers to create and deliver blended and fully online courses. Most of the universities visited in this study had such centres and staff. Despite these developments, a very large part of European higher education design and delivery is still quite traditional, and in some countries is particularly so.

Some countries have created national agencies to support universities and their staff to use technology and to re-think the curriculum (e.g. NO, NL, UK), and these have been valuable in improving parity between universities. This is a model well worth considering by those countries without such agencies, or where agencies exist that could have support for pedagogy and technology added to their remit. These agencies have often focussed on innovations in assessment, often through the use of technology, as this is a difficult part of education to change but important if student learning is to be deeply affected.

Although much innovation in the curriculum is driven bottom-up by teachers, some universities have taken a more strategic approach and adopted a digital education strategy. However, to encourage widespread and sustainable innovation in teaching and learning, teaching needs to be valued alongside research, and one method for doing so is to require accreditation of university teachers, which recognises the importance of technology in that role.

The section explores some of the major innovations of the past few years in the use of technology and in pedagogy, with examples of many of these being identified in the case study universities. These innovations include: adaptive learning; e-portfolios;

flipped learning; inquiry based learning; learning analytics; MOOCs (Massive Open Online Courses) & open educational resources; and students as co-creators.

Quality assurance (4) has played, and continues to play, an important role in both giving confidence in the quality of European higher education qualifications and supporting the enhancement of educational quality. Quality assurance takes two main forms – ex ante and post hoc, in which degree programmes are evaluated before they are offered to students or after they have been delivered. The former can act to slow down the process of development or change of degree programmes if it is itself slow, whereas the latter allows greater agility to universities, especially if it takes the increasingly common form of institutional review or audit in which the overall quality of provision is reviewed.

One recent, and welcome development, has been the revision of the European Standards Guidelines for Quality Assurance in the European Higher Education Area (ESG, 2015) which is more explicitly open to innovation in use of technology and pedagogies. The extent to which national QA agencies adopt this, and apply it positively will be vital. Whilst an independent and pedagogy-neutral approach is important for quality assurance agencies, a key conclusion was that they also need to be more encouraging to universities about the importance of innovation and support it more explicitly in their work, both nationally and at the European level. This is important if they are to support a change agenda as well as maintain and improve existing quality.

Universities are clearly seeking internal quality assurance frameworks and criteria to help them to assess the quality of their new courses and degree programmes that use technology and different pedagogies. Universities appear to be using the same QA and accreditation processes for all forms of credit-bearing provision, especially as their experience and confidence with digital education increases. No case study university offered an alternative approach. However, new frameworks have been developed and tested by the international e-learning communities (Marshall, 2012; Williams et al, 2012a & 2012b; EFQUEL, 2011), and so national QA agencies should consider how best to learn from these experiences and incorporate some of the quality measures that have been developed into their own practices, with the support of European Association for Quality Assurance in Higher Education (ENQA) to share good practice. It is clear from recent studies (Gaebel, 2014) that many universities are unsure how to move forward on e-learning quality, and that their national QA agencies are not yet fully engaged with this problem.

Quality assurance agencies are almost entirely focussed on degree provision, but the expanding area of CPD and lifelong learning, including open education, need to be considered to ensure quality in these important areas too. Internal QA and institutional review are probably the best mechanisms to ensure agility and flexibility for universities.

Close working with other national agencies with remits in pedagogy and technology is essential to ensure a joined-up approach to modernisation and to pool the expertise that exists across the sector. Quality assurance agencies would also benefit from ensuring that they have appropriate internal expertise in all areas of higher education teaching and learning, which therefore includes innovative approaches to pedagogy and technology.

Funding for higher education (5) has been static or declining in almost all European countries (EUA, 2014), and this has made innovation more difficult for universities to initiate or maintain, especially in countries with a dramatic decrease in funding. National and regional governments should ensure that they have an explicit policy for modernisation of their higher education teaching and learning provision, and ensure that barriers do not exist to universities desire to innovate. Funding is a powerful tool for change but it can also be significantly inhibitory, for example when it restricts students to physical locations or to certain modes of study (e.g. NL, UK, PL). In most European countries the state is the major (direct) funder of higher education, especially at degree level, and so they should explore ways to stimulate innovation, without necessarily increasing overall investment, through the mechanisms available to them. These include changes to performance-based funding, earmarked funding for large-scale innovation and funding for excellence. Examples of uses of various funding mechanisms to support innovation were identified in the case study countries (NL, DE, FR).

Governments need to invest funds and efforts that will result in sustainable system-level changes, learning lessons from past programmes and initiatives. The areas in which they should invest include: engaging in dialogue with stakeholders to reach shared vision of the future; strengthening enablers such as university leadership and teacher development programmes; supporting their most innovative universities; and stimulating collaboration between universities.

The costs of new modes of teaching and learning are poorly understood and this may be unhelpful to universities wishing to invest in innovation. Effort needs to be applied to gaining a better understanding of their costs and benefits, for both degrees and short courses. Some models exist (e.g. Laurillard & Deepwell, 2014), which could form the basis of further work. Governments should promote the development of cost and benefits assessment models, using consistent benchmarks.

The **Conclusions (6)** draw together the findings of the study and the arguments for the eleven Recommendations.

As noted in the Introduction, addressing policy recommendations to the national higher education systems in Europe is challenging due to their very diverse nature and their different stages of development. A few European countries may consider that they are addressing some of these Recommendations, and so there is a risk that they lose impact for some readers due to that fact. However, a question for policy makers who do consider that they are already addressing particular Recommendations is to ask themselves: "But is our depth and speed sufficient?" The various sections of this Report set out some major challenges for European higher education; the vision set out in the European Commission 2011 communication (EC, 2011), and parity with other world regions, will not be achieved, if individual national efforts are too weak.

The eleven Recommendations from the study, addressed at the system level, i.e. governments and their national or regional agencies, are:

Overarching

1. *At European and national/regional levels, all policies and processes (including legislation, regulation, funding, quality assurance, IT infrastructures, pedagogical support for teachers) must be aligned to prevent conflicting actions and priorities. These policies and processes should support and promote innovation in pedagogies and greater use of technology, and a vision for change should be expressed through national strategies.*

2. *A common agenda should be agreed between the stakeholders in higher education that addresses the challenges of the present as well as shaping a roadmap for the future. This agenda should allow sufficient flexibility to develop concrete actions, particularly at national and regional levels.*

Curriculum design and delivery

3. *All countries should put in place measures to support universities in their innovation in pedagogies (including learning design and assessment) and in greater use of technology. Establishing dedicated agencies at national level has proven a powerful means of driving change*

4. *Building on the strong existing base of digital education, European and national metrics should be established to record the typologies and extent of online, blended, and open education at institutional and national levels. This would enable institutions to compare themselves with others and to monitor their own progress.*

5. *National governments should consider requiring certification of university teaching practice, both initial and continuing (CPD), and that innovation in pedagogy and use of technology should be a core part of this certification. Certification can be used to support research into teaching and learning, which itself is an important part of raising the profile of university teaching.*

Quality Assurance

6. *National governments must review their legislative and regulatory frameworks and practices for quality assurance and accreditation in higher education (including recognition of prior learning) to ensure that they encourage, and do not impede, the provision of more flexible educational formats, including degrees and other ECTS-bearing courses that are fully online.*

7. *National QA agencies should develop their own in-house expertise and establish processes that are sufficiently flexible to include recognising and supporting new modes of teaching and learning. They should evaluate institutions on their active support of innovation (or importantly, the lack of it), and its impact on the quality of teaching and learning.*

8. *ENQA and other relevant European networks should support the sharing of good practice by national QA agencies in the development of criteria on the recognition of new modes of teaching and learning.*

Funding

9. *Governments should consider prioritising innovation in their funding approaches, using funding mechanisms such as performance-based funding, funding allocated to large-scale innovation, and funding for excellence, in order to invest continuously in modernising their higher education systems and stimulate early uptake of innovation and new pedagogies.*

10. *To be effective and systemic, this funding should strengthen the enablers of innovation at the system level, including - leadership for institutional change, learning technology tools and course design, professional development of teachers, communities of practice , the development of shareable resources and the support of evaluation and research evidence. Collaboration within and between institutions should be stimulated.*

11. *Governments should stimulate higher education institutions to assess the costs and benefits of blended and online education, in order to maximise their effectiveness in making use of new modes of teaching and learning for degree studies, as well as for continuing education and open education.*

1. Introduction

Overview of the provision of higher education in Europe

1.1. In the last 50 years, higher education in all European countries has moved from elite to mass provision, and arguably in some cases now approaches universal provision (Trow & Burrage, 2010). Data from the Eurydice service indicate that in most EU member states, over 40% of young adults participate in tertiary education (Graph C8, Eurydice, 2012). However, this development has been uneven, and investment has not always matched aspirations, as evidenced by challenges in meeting the Lisbon Strategy targets (EC, 2010), and an even more challenging set of targets in Europe 2020 (EC, 2015b). The recent global recession has greatly impacted the ability of some EU member states to invest in their higher education systems, and has undoubtedly made investment in the system more difficult for all of them.

1.2. Alongside the desire to expand access to higher education for more young adults (mainly high school leavers), has been a wish to focus on those with greatest socioeconomic disadvantage (a process generally called "widening participation") and also to expand lifelong learning in recognition of the need for working adults to re-skill/up skill during their working lives, and also for those out of the workforce to re-join it (EC, 2012). Higher education is viewed by all as essential to a buoyant economy, global competitiveness and underpinning the "knowledge economy". Beyond this instrumental view is one that regards higher education as also vital to informed citizenship, a more satisfied population, and as a right not a privilege (EC, 2012).

1.3. These objectives are expensive for countries to address, and so various approaches to re-thinking the funding of higher education have taken place alongside the discussions of scale and reach, with intense debates taking place in some countries over whether to introduce fees for study, at what monetary value, at which study level (cycle), and for whom (e.g. national vs international students).

1.4. All these changes have taken place in a rapidly changing context. It is commonplace for our unsettled times to be described as unique or unprecedented (a view not shared by many historians with long historical perspectives!) but, unique or not, it is clear that technology, travel and, socioeconomic shifts have created an environment for higher education that is markedly different to that of the middle of last century, when much of the western higher education expansion began.

1.5. As a consequence, threaded through the debates about how much higher education capacity is needed, for whom and with what funding mechanism, has been a debate about how best to create a higher education system that is "fit for the 21st century", to modernise a form of education that has deep roots going back to at least the 19th century, and to varying degrees to even earlier times. The traditional didactic approach common in the vast majority of European universities is seen by many as "not fit for purpose", and so an education system that takes advantage of the great affordances of technology, and the different pedagogies that it can more readily support, is regarded as essential (EC, 2013, 2014a). It is worth noting here, at the outset, that not all European universities do operate the traditional didactic model: open universities have employed different approaches, as have some experimental universities based around project work, and new (sometimes for profit/private) providers of higher education which have gone directly to fully online provision. (The latter are much more evident in the US and Australia than in Europe.)

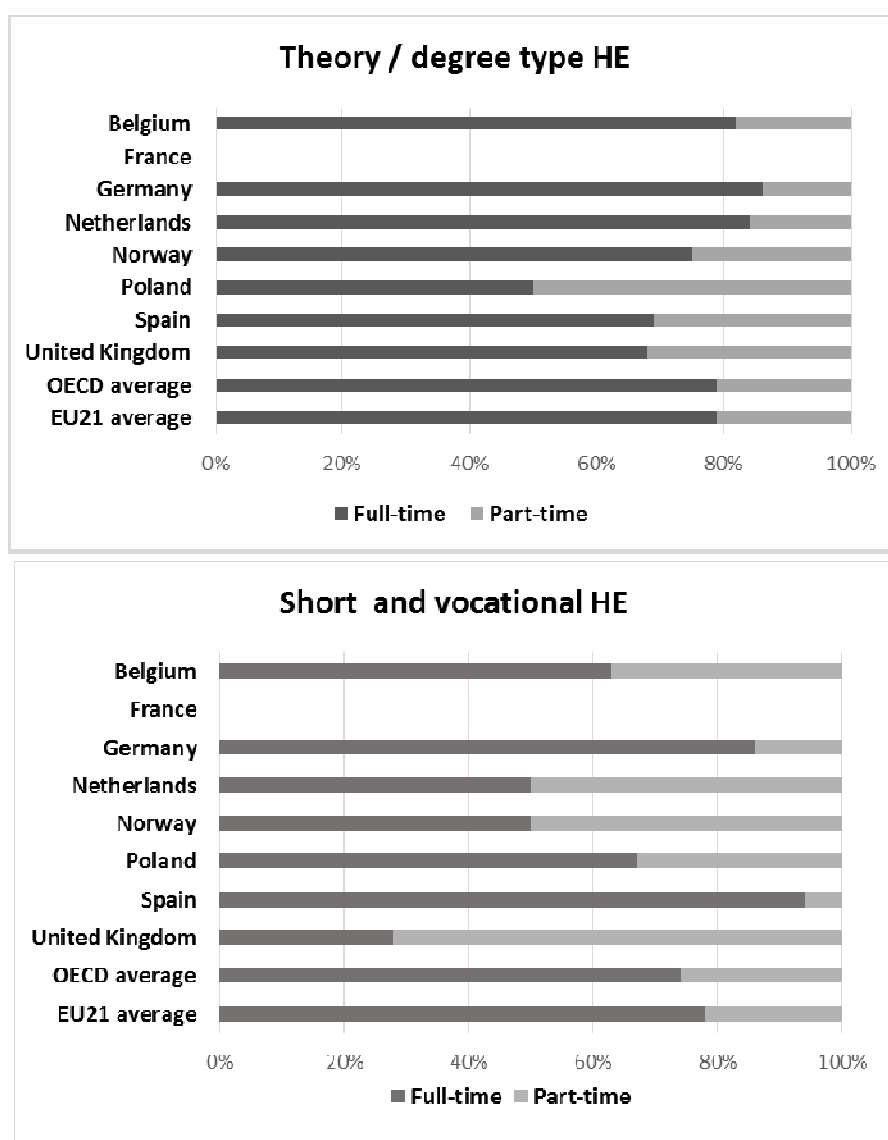## Variety in the higher education systems of EU countries

1.6. Across the EU, management of the national higher education system varies significantly, as does the internal management of the universities themselves. We can classify the management of the system into types:

1. National government control vs regional government control (there are no instances of absence of government involvement in higher education)

2. Universities funded directly by national or regional government vs funding via an arms-length agency vs minimal government funding

3. Legislation for university operations vs complete legal autonomy

4. University teachers are state employees vs teachers are employees of independent organisations

5. The state controls degree awarding/accreditation vs universities are able to award and accredit their own degrees

6. Government controls which universities can operate (or indeed to use the title "university") vs any organisation can establish itself as a university (HEI)

1.7. The choice of model sets the extent to which universities are autonomous entities, and so set limits on the options that are open to governments to shape university strategies and directions. This is not to say that indirect management is weak, for if in nothing else, universities in all EU countries are dependent to some significant degree on government funding, even if only for the grants or loans to their students, and so universities generally have to comply with the general or specific desires of their regional or national governments.

1.8. The universities themselves are varied organisations. In governance, some have strong "presidential" authority while others have a strong faculty or Senatus (academic body). Some universities have a strong commitment to transnational education (e.g. overseas campuses, franchised degrees, online degrees) whilst others are very local in their operations. Universities in countries that have recently become liberalised may have little "baggage" from development in the "70s and 80s" and so may be able to act faster than those with a longer history of technology and educational development.

1.9. Finally, some countries have an open university which can act as a focus for distance education, and for which significant numbers of university teachers, and sometimes senior managers, have worked, thus gaining an experience of distance education that is not available in traditional universities.

1.10. Some of the main characteristics of the higher education systems in each of the eight countries in this study (France, Spain, Germany, Lithuania, Netherlands, Norway, Poland, UK) are presented in a summary form in Appendix 1 in order to show the variations that any policy recommendations must account for or at least be able to accommodate.

Student populations in Europe

1.11. There is a very commonly-held view amongst both the general public and politicians that higher education still consists mainly of full-time students aged between 17 and 22 years taking degree courses of 3-5 years in duration. This view is reinforced by many speakers and writers in higher education who, for simplicity of argument, often reduce the actual complexity of their presentations by concentrating on this traditional age group and educational format, despite often offering a disclaimer at the outset that the "picture is more complex". The complexity is compounded by marked differences between states in the EU in the overall make-up of post-compulsory education and the way data are gathered and classified.

The graphs below show recent data gathered about the numbers of full-time and part-time students, taking (long) degree programmes or short courses in several EU member states (Source: EUROSTAT, 2014).

What is invisible in these data is the number of learners outside formal higher education who study with private providers, both in-country face-to-face and online, and internationally online. MOOCs have demonstrated the attractions of some of this, and also the difficulty of assessing its scale in European populations.

Theory / degree type HE

Full-time | Part-time

Belgium, France, Germany, Netherlands, Norway, Poland, Spain, United Kingdom, OECD average, EU21 average

Short and vocational HE

Full-time | Part-time

Belgium, France, Germany, Netherlands, Norway, Poland, Spain, United Kingdom, OECD average, EU21 average

1.12. In addition, increasingly there are student populations beyond the boundaries of the states in which the universities are located, studying in one of the forms of trans-national education (TNE) which can be distance learners, or those on overseas campuses or at higher education providers offering franchised degree programmes validated by an EU university. Very few data sources are able to offer a full insight into this complexity in a coherent format, but increasingly attempts are being made to document growth in this area (BIS, 2014; British Council – DAAD, 2014; British Council, 2013).

Effecting change in the higher education system

1.13. The European higher education system is complex, consisting of at least seven main "levels" if viewed as a hierarchy (Fig 1). To effect change in the system, actions at higher levels should lead to positive actions at lower levels (where positive means aligned with the outcomes intended at the levels above), and this cascade of effects should reach the individual teacher and be converted into desirable and beneficial changes in their teaching practice in support of learners. A current example of such a top level desire is the Yerevan Communique (EHEA, 2015) which seeks a student-centred higher education system. It is clear that to achieve this objective, actor at every level (including students) must ensure that they are behaving appropriately and have the right attitudes towards the desired outcomes.

Fig 1, Cascade of policy actions to reach the "chalk-face" level
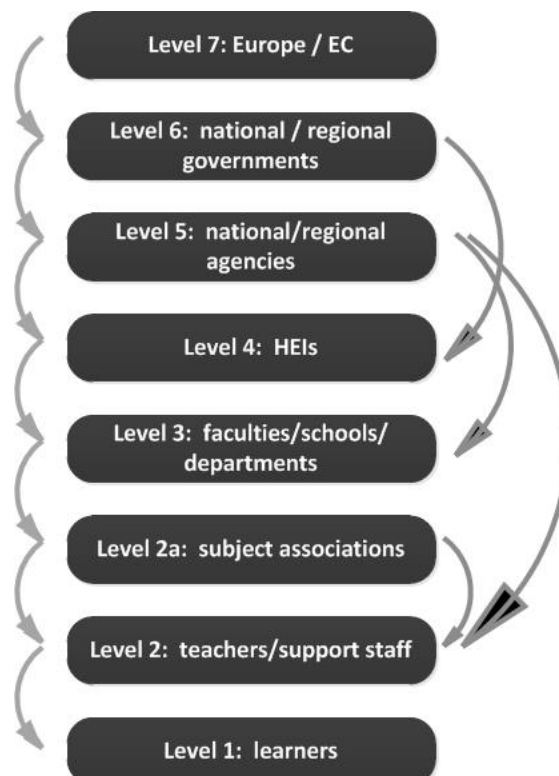
1.14. The external environment is highly influential – the higher education system is not closed. Employers, economic conditions, societal changes, technological changes, and the political environment all impact, as do actions taken in peer or competitor countries and regions.

1.15. The challenge of changing, perhaps transforming, a system as large and complex as the European higher education system will require investment of significant effort from within the system as well as potentially requiring direct financial investment depending upon the extent of change needed. These changes have to be effected whilst maintaining the current system's architecture and quality – the "factory cannot be closed for refurbishment" – as each individual learner, current or intending, is dependent upon it.

Innovating higher education: pedagogy, technology & the challenge of change

1.16. The desire to find alternative pedagogies to the teacher-centric didactic information transmission model has a long history (Phillips, 2005), and it predates the emergence of technologies for learning and teaching, and especially internet-based technologies, by many years. In any case, care needs to be taken in assuming that the importance of lectures in higher education precludes other teaching and learning techniques, as projects, laboratories, seminars and tutorials have co-existed with them for an equally long time. Educational research has provided ample evidence for the low effectiveness of information-providing lectures, the need for explicit and intelligible learning outcomes with a variety of teaching and assessment methods aligned to them (Bligh, 2000), although the penetration of this evidence base into the thinking of the majority of higher education teachers is low (Phillips, 2005). Teaching is predominantly a craft learned from experience in university, from peers and by personal exploration. However, there are signs that this is changing to varying degrees, with the introduction of pedagogy support services, rising interest in new technologies and a need in universities to recognise and reward teaching excellence so as to provide a cadre of senior staff to lead this increasingly demanding area (HEA, 2015; Woods, 2011).

1.17. Since the first half of the 1990's, computer-based technologies have gained increasing importance in higher education teaching and learning, expanding greatly following the appearance of an easy-to-access internet, Wi-Fi and mobile devices. Investment in technology has been substantial, both nationally and in individual HEIs, and most countries have universities with reasonable to excellent ICT facilities; this is an area in which survey data have been consistent (e.g. Educause, USA; UCISA, UK; SURF, NL; ICT Monitor, NO). However, the increasing interest in ICT and the opportunities for their use in different pedagogies has not automatically led to educational change, rather they can and have been used to modernise or embellish traditional practices (see Section 3 for more detail on this topic). In addition, little is known from surveys about changes to pedagogies, which are undoubtedly more difficult data to gather, where terms are less precise than they are for ICT, and where actions are less at an institutional level and more at a local level in courses and faculties/departments. Again, this point is addressed in Section 3.

1.18. In addition, there is a tendency for the use of the phrase "new technologies" to be taken as a proxy for "new pedagogies", and sometimes technology is offered as an end in itself, and as a marker of modernisation. This elision is unfortunate and is something that this Report tries to avoid.

1.19. One clear message has come through the discussion about innovation in pedagogies and technologies: that changing the way learning and teaching are carried out requires committed and informed teachers, and a prerequisite of that is that high quality teaching is valued by universities and by funders alongside research (Boyer, 1997). Thus any actions at the high levels of the policy cascade must either result in, or be accompanied by, appropriate reward and recognition systems for university teachers. This point is elaborated in Section 3.

1.20. It might not be unreasonable to describe the current situation for European higher education with respect to the use of ICT in teaching and learning as "technology within and alongside traditional forms of higher education teaching and learning", and to state that "substantial change has not taken place in pedagogies". It is not clear at present that a vision for a very different pedagogical approach in higher education is evident in most government policy documents, or in their various financial or legislative initiatives. Much of the investment that governments have made, directly or indirectly, has concentrated on increasing the use of technology as opposed to changing pedagogies through that increased use. This is clear from the country case studies, where ICT investment is widely commented upon but pedagogical development is much less apparent (Appendix 1). The lack of clear guidance or direction as to how the higher education system would look in a new form may result in most universities being unwilling to take high risk strategies, either alone or together. Although cost is a constant element in the higher education debate, there is an interesting lack of analysis of how ICT might reduce these costs, or could offer higher throughput at the same cost (Bowen, 2013).

Addressing modernisation of higher education at the European level

1.21. A consistent action to re-shape the form of teaching and learning in European higher education at policy level has been put in place by the European Commission through a series of programmes under the leadership of DG EAC. Beginning in 1994 through to the present time, the Socrates I and II, the Lifelong Learning and now Erasmus+ Programmes have invested in projects, pilots and research (or perhaps better R & D) to explore how best to incorporate ICT in higher education, to expand internationalisation and student/staff mobility, to trial new pedagogical approaches, and to form networks of professional educators around common areas of interest. Some aspects of the European research programmes (FP 6 & 7, Horizon 2020) have also addressed this area. These programmes are funded from member state subventions to the EU, and are approved by them as part of the regular EU financing cycle.

1.22. Visions and strategies, such as Europe 2020, are brought for agreement with Ministers for Education/Higher Education, and targets agreed for member states to strive to meet. Several recent reports have been influential in provoking thinking across Europe about the purpose of higher education and the forms in which it is offered. "Supporting growth and jobs – An agenda for the modernisation of Europe's higher education systems" (EC, 2011) and "Rethinking Education" (EC, 2012) have both emphasised the need for European higher education to be substantially re-shaped to take advantage of ICT and new pedagogies in order to be fit for purpose in the 21st century. A recent study for the EC (Crosier et al, 2014) confirmed the challenges still faced by potential students in Europe to gain access to higher education and once admitted to "stay the course". Mechanisms such as recognition of prior learning (RPL) and more flexible pathways for study were amongst those considered as essential for progress in reaching access and retention targets.

1.23. Two reports from the High Level Group on the Modernisation of Higher Education (EC, 2013, 2014a) have offered helpful recommendations for ways to improve higher education teaching quality and to introduce more use of new modes of teaching and learning, based upon their interviews with key informants from across Europe. Overall, the view offered by these reports and proposals of the past few years is of a European higher education system in which the quality of teaching and learning has been, and remains high, but at the same time of a system with an urgent need for change in the fundamentals of how degree programmes and individual courses are organised and offered so as to ensure that Europe does not fall behind the rest of the modernising global higher education system.

The three major levels of higher education provision

1.24. In all western higher education, three complementary areas of provision are clear and are growing: degree education, delivered either blended or fully online (in all three Bologna cycles - Bachelor, Master and Doctorate); continuous education and continuous professional development, blended or fully online, including short programmes and non-degree education; and online open education through OERs and MOOCs (Allen & Seaman, 2013; Gaebel, 2013, 2014; Eurostat, 2015). European universities are no exception to this trend, and evidence of all these formats can be found in many university websites, and in the university case studies gathered as part of this study. As technology is now essentially ubiquitous in degree education, some form of blended is the baseline offering, which was clear from all the case studies used in this report and from publications (e.g. Gaebel, 2014; Henderikx, 2010). As noted above, the use of blended or online formats in these three educational areas does not also imply that there has been innovation in pedagogy, which may remain quite "traditional", as it has for example in most MOOCs.

Degree education

1.25. In Bachelor and Masters degree education, blended teaching and learning has been introduced largely to enhance quality. All the university case studies in this study reported this as their main reason for introducing technology, and it was a strong feature of the results of the Delphi study. Although dealing with large student numbers at a lower cost per student appears not to be a prime objective of universities, rising student numbers at flat or decreasing funding must have driven efficiencies in the system, some of which will have been enabled by ICT. This is especially true for administrative systems to manage education and support students. This is happening in almost all universities as shown by various surveys in Europe and the rest of the world (e.g. Educause, USA; UCISA, UK; SURF, NL).

1.26. Conventional universities do not show any appreciable sign of abandoning face-to-face education for their Bachelor or Masters students, even as they increase blended education and begin to offer fully online degrees. It is likely that they will always value traditional teaching and learning formats and combine them with online formats. These blends may vary between Bachelor and Masters programmes, and may also vary between universities. A helpful analysis of this thinking can be found in Mapstone et al, 2014.

1.27. Alongside the move to more online education, as noted above there is a shift in the types of students in the higher education population, from the stereotypical full-time, residential, straight-from-high-school young adult to much more part-time study, students working alongside their careers and not just in casual employment, wider socio economic and ethnic origins of citizen students, and more students coming from beyond country borders and beyond Europe. This increasing diversity is being supported by more use of technology to enable greater time-place flexibility for study and pedagogies are being re-thought and developed to meet new needs (reviewed in Section 3).

1.28. Open universities too have changed their approach to teaching, moving from a paper-based and video-based approach with reliance on face-to-face tutoring in study centres to degree programmes with a large interactive online component, with less face-to-face interaction, and with assessments online, in order to offer the flexibility required for their (mainly working, adult) students.

Lifelong learning

1.29. Universities vary in the extent to which they offer lifelong learning (LLL) at advanced levels, and it is probable that continuing professional development (CPD) is the main area in which they are active. LLL courses are generally short (one-day or a modest number of study hours spread over a few weeks). In general they appear not to be offered for university ECTS credit, although CPD training points may be awarded, or a university certificate. In professional subjects, especially clinical and para-clinical, courses are often recognised by the relevant professional association, and many of these have a European overarching body that enhances transparency and portability of awards.

1.30. As a rising percentage of the European population acquires a Bachelor degree, and high skill employment is stimulated by governments as part of their economic strategies, more advanced level LLL/CPD will be needed, and not all of this needs to be, nor is now, offered by HEIs. The impact of these changes on formal higher education, and the blurring of the traditional formal boundaries around the sector, is explored in Section 2.

Open online education

1.31. Open online education is a new area of activity for almost all universities that have taken up the challenge of MOOCs and OERs. Although open universities have been open to all (effectively) regardless of their formal qualifications, they have not been free of charge and nor were their educational materials open to public view. Open online education is now taken to mean "anyone with an internet connection can access it without fee for study". The nature of MOOCs and OER has been well reviewed, as have the reasons why universities have adopted them, and also the economics of open education (Haywood & Macleod, 2014; Jansen & Schuwer, 2015). Some European universities have been in the early adopter phase of MOOCs and OER, and European MOOC delivery platforms have been set up.

Fig 2, three interlocking areas of higher education provision
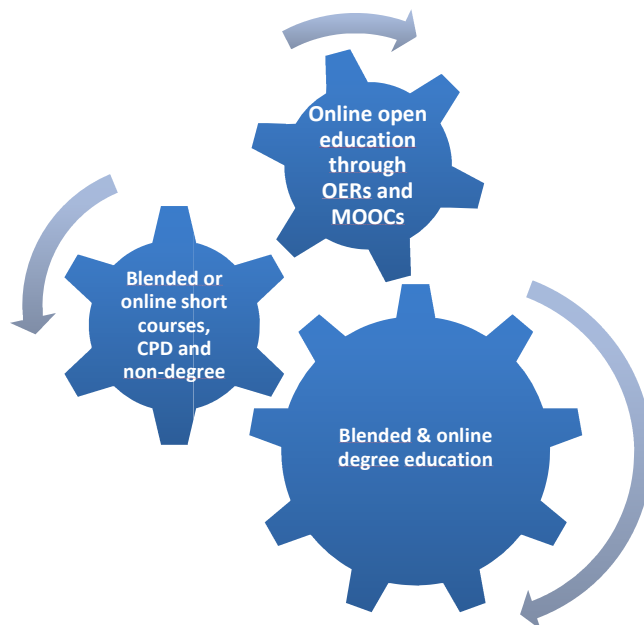
1.32. These three areas of higher education are interdependent and overlapping (Fig 2), as the same teaching staff and departments are often operating all three of them, and the materials and techniques developed in one area can be ported into the others. There is evidence that some universities are viewing these three areas together as part of a digital education strategy and so it will be important that they have sufficient autonomy to set this direction and act without undue hindrance or obstacles. The strategy for each university will depend on how it sees its role in its city/region/country/internationally and on its internal strengths and capabilities. Income streams from the three areas should be sufficient to maintain them, but also if wished allow cross-subsidy if that supports the institutional strategy. In general across Europe, full-time Bachelor degree education is mainly government funded (although the mechanisms vary), full-time Masters education is fully funded in some countries and not funded in others, and part-time study is most variable in its government funding. Most lifelong learning is not funded by government, but is left to the individual or a sponsor (e.g. employer).

The methodology of the CPL study

1.33. The study was designed to address the overall objective and a set of specific questions that were set out by DG EAC in the tender specifications:

The overall objective of this study is to examine to what extent government strategies and higher education regulatory and accreditation, funding, quality assurance, assessment and certification frameworks support or hinder new modes of learning, and in particular increased use of technology in the teaching and learning process. The research should further formulate conclusions and recommendations on how these systems – the framework conditions for higher education - can best be tailored to support new modes of teaching and learning.

The specific objectives of the study are:

1. To identify the implications for pedagogy in established higher education institutions of the most significant practices and trends in new modes of teaching and learning.

2. To complete an overview of what government-led strategies, policies and measures exist in the countries included in the study to foster an increased use of ICT in the higher education teaching and learning process and the key aims of these (for example, widening access, increasing quality, increasing revenue, reducing costs, providing a "taster" of higher education as an incentive to further study).

3. To assess where the main barriers and pinch points exist to the effective exploitation of new learning methodologies with a particular emphasis of formal higher education frameworks of accreditation, funding, quality assurance, assessment and certification.

4. To formulate recommendations for policy makers at the level of higher education systems on how to promote and harness new modes of teaching and learning to improve quality and relevance and how formal frameworks can empower and incentivise higher education institutions to exploit their potential.

In addressing the above, several aspects have been addressed in the areas of curriculum design and delivery; accreditation, quality assurance and certification, and funding frameworks.

1.34. The workplan included:

Formation of an Advisory Board which was formed for consultation and advice on a regular basis, and where major outcomes were being discussed and/or presented to the EC. The Advisory Board consisted of: Maria Kelo, Stefan Jahnke, Yves Punie, and Paul Rullmann. Their expertise in the major areas of the study provided in-depth commentary on the early, middle and late stage outputs.

Selection of the eight European countries in which in-depth case studies would be conducted.

The countries selected were: France, Germany (N Rhine-Westphalia), Lithuania, Netherlands, Norway, Poland, Spain (Catalonia) and the UK (England). In countries with strong regional control over higher education, one region was selected, although high level policy reports and desk research also included national level as well as the region. The countries were selected to provide a reasonable representation of the diversity of European higher education systems in respect of variables such as maturity of use of ICT in education, maturity of the national quality assurance apparatus, and the types of state funding mechanisms deployed in tertiary education.

Choice of experts

The experts were individuals with substantial expertise and understanding of pedagogy and technology in each of the eight case study countries. They were drawn from colleagues in higher education who were well-known to the CPL study team. They were briefed in a one-day workshop, and they used the same standard proformas for interviews and other data-gathering. The proformas may be found in Appendix 4. The experts were also invited to contribute to the Delphi study and to the final seminar. See Appendix 3 for the results of the Delphi study.

Desk research

Innovation in pedagogy and use of technology has been extensively researched and commented upon, for at least 25 years, in publications that range from academic research journals to policy papers and political pronouncements. All these outputs were addressed by the desk research, and in each country, experts were asked to identify policy documents and provide links and summaries in English where these did not exist. The desk research was not limited to European publications and sources but was global, although at the same time ensuring as much of the information was drawn from European outputs as possible, given the focus of the study.

Delphi study

To gain an understanding about how individuals in higher education viewed the potential for innovation in pedagogy and technology, the ultimate education and system-level purposes of these, and what barriers existed to progress, a Delphi study was carried out. The Delphi provided some grounding for the eventual Recommendations as these could be cross-checked against what a wider range of key informants considered to be the key reasons for modernisation (e.g. quality, efficiency, effectiveness in higher education), what barriers existed to modernisation, and how progress towards their vision of European higher education might be evaluated and monitored. Further details may be found in Appendix 3.

Policy reports from each case study country

In each case study country, the experts were asked to produce a policy report that described the way that higher education operated (legislation, regulation, funding, HEIs etc.) with links to relevant documents. There was to be a particular emphasis on investment in ICT and pedagogy change and support. These analyses provided the necessary background for an understanding of progress towards modernisation over the past few years in each country, and against which the interview data could be evaluated. A summary of each report is presented in Appendix 1.

Interviews with senior member(s) of the relevant Ministry of Higher Education or equivalent governmental body in each country

These interviews were designed to gather the current government view about, and approach towards, modernisation of higher education. All interviews were confidential to maximise open and frank responses.

Interviews with senior member(s) of intermediate agencies concerned with supporting, regulating or monitoring the higher education sector in each country

In all European countries governments assign responsibility for certain areas of higher education to agencies, which often are at "arms-length" with operational independence. The most common example is for the area of quality assurance, but national support agencies for ICT are present in many countries, and, to a lesser extent, agencies that support pedagogy and academic staff development. Such agencies are influential in how the modernisation agenda is viewed and taken forward in each country.

The interviews were confidential to maximise open and frank responses.

Interviews with senior staff, teachers and students in two higher education institutions in each country

Although the study was addressing system level, it would have been incomplete without an understanding of how universities viewed the modernisation agenda, as they are the targets of government policy and are major stakeholders in the modernisation process. It was not realistic to gather views from more than two HEIs and so these were selected carefully to ensure at least some degree of representation of the main types of HEIs in each country. The interviews were confidential to maximise open and frank responses.

Although all the interviews were confidential, a summary of the findings in each of the eight countries is presented, each being appropriately anonymised, as part of each country»s Policy Report (Appendix 1).

Final peer review seminar: a one-day seminar was organised with the participation of 33 stakeholders/senior experts to review the draft recommendations.

2. Turbulence, disruption and the European higher education system

2.1. The majority of this report addresses questions for modernisation in the existing formal and traditional higher education systems of Europe, with limited consideration of major disruption or change that might take place in the coming years. This focus on the mainstream is intentional, for although disruption of higher education is being predicted by some futurists and commentators, it seems almost certain that the core businesses of conventional campus and open universities will remain as the bulk of provision for a considerable period of time, and hence modernisation of that provision is a very high priority. This section reviews the signs and predictors of major change in higher education, and proposes actions at system level that will be needed to ensure that national universities and colleges are supported in their responses to these challenges and pressures.

It should be noted that not all disruption of higher education as it exists today will come by imposition from outside the system. Decisions by governments to seek major changes to the way higher education is designed and delivered (e.g. more flexible learner pathways, more open and online education) will lead to uncertainty for those leading universities, and also challenges for those funding and regulating it.

2.2. Most of the predictions of disruption to higher education are based upon the analyses by Clay Christensen of the major upheavals in the Western music, publishing and bookselling sectors (Christensen, 2013). He identified certain types of innovation as a source of disruption (disruptive innovation) as opposed to other types which sustained existing business (sustaining innovation). Disruptive innovation brings completely new products, often at low cost and initially low quality, that develop and grow "beneath the radar" of the incumbent providers, who continue to focus on improving their existing products and services, usually at high or even increasing prices (sustaining innovation). Although MOOCs have been cited by some as disruptive agents for higher education, it might be best to see them as one example of sustaining innovation by conventional universities, alongside the use of ICT, new pedagogical approaches, blended and online education and other explorations of ways to modernise conventional offerings. The drive to innovate is currently quite strong in European universities, as the number of MOOC-offering HEIs in the region shows (Open Education Europa, http://openeducationeuropa.eu/). However, as Bowen noted, to date higher education has not been slow to adopt ICT in some aspects of its business, but evidence of its use to reduce cost or increase efficiency has not been easy to find (Bowen, 2013). The Delphi respondents in this study (Appendix 3) were divided as to whether technology should be used to drive efficiency rather than quality, and in their view of possible futures for European higher education they were mainly predicting modification rather than disruption. Thus it needs to be recognised in policy circles that the current view of the need for more technology in higher education and use of alternative pedagogies modernisation agenda, with its main focus on sustaining innovation in the existing higher education system, alongside the orientation and preferences of many technology and pedagogy experts, may only be addressing the challenge of disruptive innovation to a very limited extent.

2.3. Christensen's analysis of conventional higher education led him to suggest that start-up online education providers, often in specific and high value subjects, with shorter offerings at lower costs, less "fussiness" about formal educational prerequisites and timescales, could displace traditional higher education (Christensen & Eyring, 2011). He also showed that incumbents were often dismissive of the new-comers and treated them with disdain. Christensen and others have offered numerous examples of the growth of new providers in western higher education (Christensen & Eyring, 2011; UUK, 2010). To date these have been most prominent in the USA, but the UK has recently permitted private, for-profit universities/university colleges to operate and offer degrees (BIS, 2013), and online education has no national boundaries as MOOCs have amply demonstrated (Gaebel, 2014). Corporate universities are increasing in number steadily, and have the monopoly on employees for basic and advanced vocational training (Fouillard, 2015), and the larger ones also have global reach.

2.4. It is hard to tell if the trends seen in music, bookselling and newspapers will be repeated in higher education as the nature of the services are very different, and it is not likely that, at least for degree education, they will shoulder existing HEIs aside, particularly as all governments protect their higher education systems as part of their national brand. This was clearly seen in national reactions to MOOCs (Future learn, 2013; French Ministry of Higher Education, 2013) and also because incumbents are recognised and accredited within their national systems (and in Europe within European systems). Moreover, these new providers generally do not challenge conventional and open universities across the spectrum of subjects and levels but target professional and vocational education in the most profitable areas, including lifelong learning/CPD. They therefore have the potential to reduce existing or potential income streams for universities that are already financially hard-pressed.

There are, in addition to these developments, even wider explorations and potential changes underway, which are briefly addressed below. A fuller discussion can be found in Haywood, 2015.

2.5. Transnational education (TNE) was noted in the Introduction as one area of higher education that is growing in complexity and scale as European universities attract students from beyond the EU through the use of distance education, franchising and in-country delivery (British Council-DAAD, 2014). What is notable about TNE with respect to European higher education is that it "cuts both ways", and in addition to competing for students from outside the EU, some countries may begin to draw EU citizens into their own TNE offerings. The USA has done this for some time in conventional education, albeit on a modest scale (Altbach, 2004; De Witt, 2009) but the potential for TNE study for EU citizens is greatly enhanced by the maturing of online education. TNE raises challenges for all higher education systems, including for current modes of quality assurance, funding and curriculum design and delivery. Remote campuses and degrees franchised to local HEIs are difficult to audit, and problems have emerged (THE, 2001). Qualifications offered online from countries outside the European region are not subject to national quality assurance and so citizens taking up such offers do so at their own risk, in contrast to the situation with national awards. Global mutual recognition and accreditation systems are still immature (see ENIC-NARIC http://www.enic-naric.net/) and growth in this area in particular is likely to proceed much faster than they can keep up with.

At present, governments mainly fund university study towards first degrees in their own country or inside the EU (although even this is quite complex, see http://europa.eu/youreurope/citizens/education/university/fees-and-financial-help/index_en.htm). With no requirements for residence, with its associated

subsistence costs, low fee countries may begin to look attractive to students, and governments will need to review their approach to supporting their citizens in such study. In most European countries students pay fees at Masters level and it is in this area that competition between universities inside and outside Europe will be most intense. Postgraduate education in the English language is now widely available across the world. Online education is much more open to external scrutiny than is residential education, and so the quality of what a country's own universities offer in this area is important to the national brand of its higher education system. Thus ensuring general high quality in curriculum design and delivery is not only of key importance for the education of local students but also as part of a window into the quality of the national higher education system as a whole, and to maintain competitive position in an expanding global market.

Partnerships are growing between universities and for-profit education companies, including major education publishers and global education testing services. Partnering allows universities to fast-track into global online learning without the need to build internal capabilities and capacities. They put online education and testing to a degree at "arms-length" from the host university, and raise questions about how to ensure good governance, quality and overall responsibility for the educational credentials. Examples of companies that partner with traditional universities include: Academic Partnerships, Laureate and, Pearson.

2.6. Competency-based education (CBE) is a movement largely limited at present to the USA, although in vocational education the concept of proving competence is well embedded. By assessing student learning in terms of demonstrable competencies (which can include knowledge, skills and attitudes) and not as a record of classes attended nor time taken, CBE seeks to offer a much more flexible approach to higher education that will support adult, part-time, mobile etc. learners (Weise, 2014). This form of higher education may be attractive to learners but also to governments as ultimate funders of much of university provision, as it offers efficiencies hard to achieve by conventional means (US DOE, 2015).

In Europe, the approach to addressing competency in higher education (and more broadly across all levels of education) has been through establishing qualifications frameworks, which are present in many countries and have a manifestation at European level (EQF, https://ec.europa.eu/ploteus/content/descriptors-page). These are very high level statements which define competencies in a generic and non-subject based fashion, and are primarily designed to ensure compatibility between awards at the same level and their difference to awards at levels above and below them. Most recently, the European Credit Transfer System (ECTS) has been modified to be focussed on credit for competence, i.e. assessing learning outcomes. This is aligned with a desire to also move towards student-centred learning (see 2.8 below). However, it is worth noting that learning outcomes by themselves do not automatically result in new ways of teaching, learning and assessment, as can be seen in the case of the UK which has had learning outcomes for all modules for at least 15 years. Examples of CBE in use in Europe include the GMAT test and the British Council's IELTS English language test, both of which test competences without any reference to how they were obtained. The CBE approach is very granular and specific, and enables assessment of competencies in individual subjects as well as generic (transferable) skills. It is closer in form to that used in Europe of ECVET in the area of vocational education and training (http://ec.europa.eu/education/policy/vocational-policy/ecvet_en.htm).

2.7. The demise of time-based credits is closely related to CBE, for if it is outcomes that are important and not how these were achieved, nor at what speed, then time in class has little if no meaning (Laitinen, 2012). Until recently, the ECTS system, and the Bologna framework, have both included strong elements of time (Bertelsmann 2014), and much university education strictly regulates the time required by learners to be on course, and the traditional academic year, with its cycle of classes and examinations, does the same. True flexibility would be substantially time-independent, and is implied, although is rarely explicit, in descriptions of a fit-for-purpose 21st century higher education system. It is at the heart of a student-centred approach.

2.8. Recently, the revised version of the European Credit Transfer System (ECTS), as set out in the Users Guide 2015 and approved in the Ministerial Conference in Yerevan, offers a view of credits that is much less time-dependent, and more concerned with achievement of the relevant learning outcomes (EC 2015 a). In the key features, the document defines workload as: "*an estimation of the time the individual typically needs to complete all learning activities such as lectures, seminars, projects, practical work, work placements 2 and individual study required to achieve the defined learning outcomes in formal learning environments. The correspondence of the full-time workload of an academic year to 60 credits is often formalised by national legal provisions. In most cases, workload ranges from 1,500 to 1,800 hours for an academic year, which means that one credit corresponds to 25 to 30 hours of work. It should be recognised that this represents the typical workload and that for individual students the actual time to achieve the learning outcomes will vary*". In addition, the document includes an extensive revision to encompass recognition of prior formal and non-formal learning, in both degree level awards and lifelong learning. This is a significant step forward, and it opens the door to traditional HEIs and new higher education providers to offer flexible and novel routes to ECTS-bearing study, including adoption of competence-based education.

2.9. Complex learner journeys are already growing in importance. The Introduction noted the rise in part-time students, a situation far removed from the university setting of 50 years ago. Increased mobility, both physical and virtual, the need for intermittent study which new providers might cater for specifically, and greater use of educational portfolios with varied content, pose serious problems for measurement of progression. Experiments with nano-degrees (UDACITY) and similar small credit units add to the complexity. Thus there is now an interest in recording learning gains (HEFCE, 2015) as part of a solution to this rise in complexity. University academic record systems, routine ability to transfer student records between education providers nationally and globally, transparency of fee regimes, credits etc. will all require substantial effort to redesign. Several of the interviewees in this study recognised the challenges ahead in this area.

2.10. The variation in the ways that learners progress through higher education, particularly non-degree provision, has led to predictions of "unbundling", in which the design, delivery, assessment and granting of awards may be undertaken by different agencies (OERtest, 2012). For example, one university designs and provides a MOOC but a different agency tutors learners through it, and yet another does the competency testing, while a university or college validates that assessment and offers an award. Although at present little of this can be observed, it has been analysed (OERtest, 2012) and the OER university (OERu) offers a vision of one way in which it might take place (OER university, 2015). The steady growth in high quality OER, especially as by-products of MOOCs, may lead to learners using these resources to seek to convert that

learning into formal and portable outcomes, and so both new and old educational organisations may act to try to satisfy the market. Almost 90% of the Delphi respondents in this study felt that facilitating learners to incorporate open education, badges etc. into their formal education was desirable (Appendix 3). In the USA, a few colleges already specialise in evaluating the learning of those whose education has been fragmented, e.g. military personnel, and helping them turn it into a degree (e.g. Excelsior University).

2.11. The Christensen disruption model is predicated on a willingness of individuals to wholly or partially abandon their previous sources and choice processes in favour of new ones. Thus in higher education, potential students would need to change their current behaviours and decide in favour of, amongst others, new providers, choose online over on-campus, and prefer a self-selected menu of courses from wherever seemed most appropriate. This will almost certainly be slowest for school-leavers and full-time Bachelor degree study and may be most rapid for post-graduate, for CPD/LLL, and for adult part-time learners in any cycle. The Delphi respondents did not consider that the value of university degrees will be diminished by the expansion of open education and more flexible pathways (Appendix 3). MOOCs have shown us that international online education is feasible at scale, and even allowing for the current limited learning outcomes, because experimentation is strong (e.g. Ohio and Georgia Tech MBAs, Courser a specialisations) ways will be found to overcome current challenges and take MOOCs beyond limited learning outcomes and pedagogies. An increasing number of providers offer online courses and qualifications, and enrolments in the USA are rising (Online Learning, 2014). In Europe the data are very limited and so it is difficult to assess whether the same trends are present. Adult learners need value for effort/money and employability, as do employers. Technology is broadly accepted as normal and as socialising and working online become commonplace, so online learning loses its "strangeness" (Cassells, 2014).

2.12. In almost all areas of everyday life, ranking and valuing systems are gaining acceptance and they are generally not provided by the organisations which are the subjects of the ranking process (e.g. hotels, flights, MOOCs, universities). In school-age student skills, PISA is world-recognised (OECD, 2014); OECD's AHELO is attempting to create a comparable benchmark for higher education (OECD, 2015). Although still at an early stage, AHELO is an indicator of thinking about benchmarking for teaching outcomes, homologous to those for research outcomes, that is unlikely to go away (The UK government is currently, 2015, considering as assessable Excellence Framework for teaching to parallel that in use for many years for research). These ranking and valuing systems will very likely take hold for short higher education courses as they have in some countries for universities, degrees and even for teachers (The complete university, 2015; QS, 2015; Rate your lecturer, 2015), and these will expand to offer potential students a wider palette of educational options from which to choose.

2.13. Finally, unless data are gathered about what adults are actually doing to access their advanced education and training, then simply continuing to monitor formal systems, and gathering data solely from HEIs, may well miss much of the changes taking place, and hence make adaptation that much more difficult. Ideally these data would be consistent across Europe to facilitate between-country comparisons.

Recommendations for policy makers at the level of higher education systems: coping with turbulence

2.14. *A common agenda should be agreed between the stakeholders in higher education that addresses the challenges of the present as well as shaping a roadmap for the future. This should allow sufficient flexibility* to develop concrete actions, particularly at national and regional levels.

Higher education institutions will need to be flexible and adaptable to meet these challenges. At system level there will need to be firstly, recognition of the potential for substantial change that is not amenable to controls and regulation, and secondly, that national formal higher education systems need to be able to accommodate change and not be locked into traditional modes. A valuable first step would be regular dialogue between governments, national and regional agencies and HEIs/associations to agree a common agenda for the coming years that addresses not just the challenges of the present but the changing nature of demand and uptake of higher education to come.

3. Curriculum design and delivery

Context and introduction

3.1. The impact of technology is most apparent in the manner in which the higher education curriculum is delivered and designed. While it is often stated that technology should not determine curriculum, new technology makes new approaches possible, in terms of pedagogy, subject matter, audience and financial viability. One way to examine this impact of technology on curriculum is to view it through the lens of the EU Education and Training 2020 strategic framework which identifies four common objectives:

- making lifelong learning and mobility a reality;
- improving the quality and efficiency of education and training;
- promoting equity, social cohesion and active citizenship; and
- enhancing creativity and innovation, including entrepreneurship, at all levels of education and training.

3.2. All of these objectives are influenced by the implementation of technology and the ways in which it can facilitate innovation in the curriculum, in terms of both pedagogy and content. Whether this involves accessing open educational resources (OER) for lifelong learning or helping students develop an online network identity to encourage active citizenship, it is not possible to consider these four objectives without also considering the manner in which they can be influenced or enabled by technology. In civic life participation by citizens is enabled by online access to information and participation in formal and informal discourse through social networks. Similarly higher education is being transformed by access to information enabled by technology, the interpretation and management of this information and through participation in campus, national and international online communities. The central role technology now plays has been made possible because of its mainstreaming over the past decade. This section sets out this context and then addresses the key questions for curriculum and pedagogy.

3.3. In the late 1990s there was much anticipation of the potential impact of technology on pedagogy and the curriculum. E-learning was seen as a novel approach to education. It was subject to much of the same promise, hype and anxiety that we now see with approaches such as MOOCs (Massive Open Online Courses). It could variously offer a cheap way of providing education (Noam, 1995), make lecturers redundant (Noble, 1998), provide a route to innovative ways of teaching (Weller, 2002) or remove the barrier of distance (Mason, 2000). While many educators embraced the possibilities offered by e-learning by adopting innovative pedagogies and using a range of media and tools, there was reluctance and resistance from many. A combination of the perceived efficiency benefits, flexibility for learners and the ability to reach new audiences meant that e-learning was soon on the agenda of most senior managers in universities. Much of the focus was on the provision of content and access to knowledge, since digital media and the growth of the Web provided access to rich sources of information. In some countries the development of interactive media for teaching was supported financially with the objective of creating national repositories of digital resources.

3.4. The early stages of e-learning adoption were often characterised by a mixed economy of technologies, with academic departments in a single institution adopting different systems. Initiatives were usually driven by champions and early adopters often acting in advance of the formulation of institutional policy. The early 2000s saw an inevitable consolidation phase as the maintenance of so many disparate systems became problematic. In order to reap the perceived benefits of e-learning, a uniform approach was required. This is when the Learning Management System (LMS) or Virtual Learning Environment (VLE) became the dominant solution. For instance, in the UK by 2003 86% of higher education institutions had one (Browne and Jenkins, 2003). The LMS provided a convenient suite of tools and the use of a standard system facilitated staff development programmes and allowed students to make use of a consistent technology. All of this facilitated the uptake of e-learning. Champions of such an approach viewed it as a positive advancement. The LMS was the key to e-learning. It became a mainstream approach with its primary function being the provision of access to knowledge resources and teaching materials.

3.5. Since the widespread adoption of the LMS, we have also seen an ecosystem of tools develop around it, including wikis, e-portfolios and blogs paralleling the implementation of similar tools for the development of social and civic applications on the Web. These have been integrated into the LMS, with varying degrees of scope for innovation within an enterprise system approach that implements the same system throughout the institution.

For the past decade or more, LMS has been the core technology at nearly all universities, whether they operate as campus-based, via distance education or as a blend of both. Most universities therefore routinely deploy some form of e-learning, although the exact practice varies enormously. This has led to the development of a range of appropriate support structures, in addition to the technical management and support of the system itself. Academics may be able to call on the support of e-learning champions, instructional designers and media producers to advise and assist in pedagogical development.

3.6. While the mainstream adoption of e-learning has been successful, much of the usage of LMSs has been aimed at enhancing the traditional classroom-based model. However there are examples within most universities of innovative practice which goes beyond this basic model for its use. Appendix 2 provides examples of innovative practice taken from the various case studies used for this project. These demonstrate that many institutions are implementing some form of innovative technology-enhanced curriculum.

However, there were two unfortunate side effects of the large-scale adoption of LMSs. The first was that academia often outsourced both the technology and the approach to e-learning. By adopting commercial systems such as Blackboard, they gained a robust and quick solution, but they often lost the expertise or the control required to innovate in this area.

3.7. The second side effect was largely a function of the first: rather than being a stepping stone to further e-learning experimentation, the LMS became an end-point in itself. As top-down institutional processes came into play, they created a sediment around the system, inhibiting bottom-up innovation that characterised early e-learning development phases. As the case studies in Appendix 1 demonstrate, there are promising practices and innovations, often arising from external funding in areas such as online/blended problem-based learning in medicine, virtual labs, language learning *et cetera*. These examples are often dispersed throughout the university and the very nature of universities, with their strong departmental identities, leads to difficulties in influencing general practice.

3.8.   The aim of this section is to address the following specific objective:

To identify the implications for pedagogy in established higher education institutions of the most significant practices and trends in the new modes of teaching and learning.

3.9.   These implications are also significantly influenced by the context within which institutions operate, especially in terms of funding and quality assurance models, as detailed in the respective sections. In addition, there are four contextual factors that are now giving rise to new pedagogical opportunities for universities:

1) Pervasiveness of technology—while the digital divide between those that have access to technology and those who do not is still an issue, the widespread access to computers, mobile devices and wifi makes the use of ICT in education viable for most people.

2) Technology awareness—while the digital natives concept may be a myth (Bennett and Maton, 2010), there is a widespread acceptance and use of technology amongst learners, from the use of social media sites, online retail, government services delivered online etc. This provides a basis for technology use in education and a general acceptance (and expectation) of online tools, although usage of such tools does not equate to digital literacy in how to use them effectively.

3) Abundance of content—society has moved from a position of scarcity of knowledge resources to one of abundance. For education there is access to journal articles beyond the library (particularly driven by the open access movement), video, audio, images, open textbooks and open data. This abundant, often free and openly licensed content removes many of the obstacles to access that arise on the physical campus. It also changes the role of the knowledge creator, and opens up possibilities for students to be creators.

4) Technology seen as a solution— technology-based solutions are increasingly proposed as the main approach for addressing a number of demands made on universities. For example, as universities seek to meet the increasing demand for education, while coping with lower student/staff ratios, increasing costs and also meeting the needs of a wider range of students, the approach is often to look for technology-based solutions.

3.10. The Higher Education sector has responded to the change in access to knowledge and information through a transition to outcomes-based standards. They have shifted their focus from knowledge-based student performance criteria to standards based on student skills in engaging with knowledge, so preparing them to be lifelong learners and reflective professional practitioners. Curricula are progressively being revised to align with outcomes-based principles, providing an opportunity for the revision of pedagogical approaches. One approach to the challenges and opportunities of this new context is to utilise a learning design methodology. In the content-led era of e-learning and in the commercial development of online training materials, development work is increasingly focused on collaboration between "subject matter experts" and "instructional designers". The instructional designer transforms the expert's materials into integrated teaching packages. Whereas instructional design has focused on particular tools, often with a behaviourist pedagogy applied at a micro level, learning design can be seen as a broader macro-level approach. It incorporates a range of perspectives and focuses on the learner's experience throughout a course or programme. Learning design has been defined as "a process of design for learning" by which one arrives at a plan, structure or design for a learning situation, where support is realised through tools that support the "process" (Cross and Conole, 2009). Learning design focuses on

representations that can be used to make the teaching intentions more explicit and show the role of technologies, people and resources in the overall process.

3.11. For example, a learning design approach can be used to move away from a teacher centric model by first considering the appropriate ways to teach a particular subject, combining a range of pedagogies. The best tools to realise this can then be added, and the flow between the various agents can be represented (see for example the Open University Learning Design project http://ouldi.open.ac.uk/). Adopting a design approach to learning is one way of breaking away from the default, habitual approaches that have often dominated the adoption of technologies thus far. Conole (2012) argues that Learning Design is a means of shifting from "traditional craft-based teacher-design (where design draws on practice and is essentially implicit) to a more systematic, explicit design approach, drawing on empirically derived and validated tools and methods for design".

3.12. This can be achieved through the use of a variety of tools (for instance LAMS http://lamsfoundation.org/) and frameworks (for instance, the University of Leicester, 7cs of Learning Design). There is no one correct approach, and various approaches are often adapted to suit the needs of a particular institution. The significant element is the adoption of a systemic, design-based approach specifically to meet the needs of the modern learner and the changing context of education, to which the traditional craft-based approach is no longer suited.

The objective refers to *the most significant practices and trends in the new modes of teaching and learning."* These were identified through the use of case studies and literature review. They are detailed in Appendix 2, but for reference the list is as follows:

- adaptive learning;
- new approaches to assessment;
- blended learning;
- connectivism and online pedagogies;
- digital badges;
- educational gaming;
- e-portfolios;
- flexible learning;
- flipped learning;
- immersive environments;
- inquiry based learning;
- learning analytics;
- mobile learning;
- MOOCS (massive open online courses);
- open educational resources;
- problem-based learning;
- seamless learning; and
- students as co-creators.

3.13. The emphasis here is on relatively new considerations for universities. Many existing approaches will continue to be significant. For example, the LMS will continue to form a central part of university service provision and collaborative learning will be a significant pedagogy.

Curriculum design and delivery

What is the impact of new technologies on the way teaching and learning is organised in higher education?

3.14. New technology has impacted on the way teaching and learning is organised at a number of levels. The use of technology has led to greater diversity in the type of offering provided. At the highest level, innovations such as MOOCs might be seen as transformative innovation with high-profile media coverage of the efforts of relatively few institutions. However, within almost all institutions the use of VLE systems supports incremental change in programmes that continue to be delivered primarily in face-to-face mode. In the middle ground is innovation through the introduction of programmes offering greater flexibility with regard to the place and time of study through increased use of online resources and delivery, and decreased formal classroom-based provision. Nearly all of the institutions used as case studies provided some form of flexible or blended learning. For example, the University of Delft in the Netherlands has made MOOCs an important component in its overall offering and currently offers 14 MOOCs with 250,000 registrations. Similarly, the majority of Delphi respondents reported a mixed model of face-to-face, blended and e-learning provision. For campus-based universities, the impact of this is significant, in that it allows greater flexibility in the curriculum and an increase in student numbers, but also requires different skills from educators.

3.15. The overall picture of innovation is mixed, as is to be expected in a sector which combines cultures of individually-focussed research and long-term institutional caution, associated with the protection of its reputation. In many ways the sector is still quite conservative, with a cautious approach to innovation in learning and teaching. Whilst their standard LMS systems provide the capability for routine delivery of fully online courses, the introduction of the first such course is regarded as a significant innovation for each institution, as factors relating to organisation, regulation and administration accompany the technical elements. The case studies reflect this. The delivery of a fully online course through a standard LMS was regarded as an innovative practice by several institutions. For example, University of Applied Sciences Alytaus Kolegija now requires all courses to have a Moodle presence, which has led to significant change in their practices. Given that e-learning has been part of the mainstream of education provision, this should be seen as standard practice, rather than still being considered innovative. However, a picture of consistent innovation also emerged. Examples of interesting practice are occurring throughout Europe. These support approaches to student-centred learning, encompassing the use of game-based professional simulations, e-portfolios and collaborative working tools.

How does online and blended higher education influence the quality of learning? Is there any comparison of quality between traditional and new modes of learning and the learning outcomes generated?

3.16. The combination of establishing highly regarded distance education institutions and the recent entry into the MOOC market by high-profile universities, such as Harvard and MIT, has removed much of the remaining prejudice with regard to the quality of online or blended solutions. Issues with regard to the organisation of quality assurance are covered in greater depth elsewhere in this study (Section 4).

3.17. Comparisons of quality have frequently shown the oft-quoted "no significant difference" phenomenon, (Russell, 1999) where the introduction of new technology does not lead to a significant change in student performance in either direction. In addition comparisons are often difficult in this area as blended or online courses may be reaching different audiences. Where studies have been conducted as part of the case studies, they have generally been positive in terms of student satisfaction and performance. One notable exception is Nottingham, which found that students preferred the campus version of a course. This correlates with research at The Open University, where the paper-based printed study units are the components most highly rated by students. However, they are appreciative of new media elements that enhance particular aspects of learning (Andrews, Tynan and James, 2011). The responses of students to what may be perceived as innovation and their expectations of what constitutes a university experience are often overlooked in technology-driven accounts of educational technology. This may account for the mixed picture of innovation which we encountered.

Are there initiatives or incentives in place at the national/regional level to train professors/teaching professionals to deliver via online, blended learning and using other technologies as part of the learning experience?

3.18. Most training of educators occurs at the institutional level. National bodies such as the JISC in the UK and SURF in the Netherlands provide programmes for research into scholarship and are also significant in raising the profile of desirable approaches to, for example, learning design. The effectiveness of such short-term programmes is questionable as their impact is localised. For example, the Centre for Excellence in Assessment that was created at Oxford Brookes as a result of a national scheme led to a definite focus on assessment in this university, but less so elsewhere. The Delphi survey identified ongoing staff development in both technical and pedagogical aspects of curriculum delivery, as a necessary condition for further innovation. At a detailed level, academics may require training and support to maximise the potential available in the quiz routines of LMS systems. Usage surveys indicate that LMS systems are used mainly for the simplest levels of testing, which do not provide the sophistication of assessment and feedback to students that is required at higher education level. There is therefore the risk of a vicious circle of lack of support resulting in rejection of e-assessment tools and neither students or institutions benefitting fully from investment in VLE systems. At the macro scale, the shift to learning design approaches requires the development of assessment systems that reflect the changing nature of the overall pedagogical approach and the integration of peer review, assessment of collaborative work with controlled assessment components, such as examinations, which are necessary for the identification of students. The growth in the use of Learning Analytic approaches will provide improved evidence of student behaviour and response to assessment processes, closing the feedback loops between those responsible for the analysis and practising academics. The transformations in professional practice brought about by ICT are relevant to both new entrants to the profession and current practitioners. Training and professional development opportunities should be available to all.

To what extent are new online and blended programmes developed by individual lecturers or by multi-disciplinary teams? Does government put in place systems or incentives to facilitate cross-institutional shared resources for the development of online and blended provision?

3.19. Most innovation seems to originate from individual educators and specific units within institutions that have been established to support and promote technological innovation. The e@HiT centre at the University of Telemark is a good example of such a centre that offers project funds to encourage digital projects. In Norway, there was a strong national focus on the implementation of open education and MOOCs following a government review, but most national agencies were hesitant to formulate such direct strategic aims. It is in the area of open education, including OER repositories and MOOC platforms, that most government incentive has been observed for shared resources.

Where examples of online and blended learning exist, do these have a particular focus?

3.20. For many institutions the use of technology, particularly to deliver fully online or blended courses is aimed at a particular sector. For example, CNAM in France is directed at professionals in the arts sector. However, there was no clear preference for particular groups. All disciplines and a wide range of learners are addressed. This demonstrates that e-learning is not restricted in its application, but rather that it allows routes to different groups of learners and approaches to teaching.

Recommendations for policymakers at the level of higher education systems: curriculum design and delivery

3.21. *All countries should put in place measures to support universities in their innovation in pedagogies (including learning design and assessment) and in greater use of technology. Establishing dedicated agencies at national level has proven a powerful means of driving change.*

3.22. These agencies will need to cooperate and collaborate with HEIs, so that there is consensus around national strategy and a motivation to deliver it. Existing communities of practice in pedagogy and technology must also be involved, such as communities involved in open education or open source software development.

3.23. Assessment may be a tool for driving innovation in pedagogy, as it is of considerable value to both learners and institutions. One of the universities taken as a case study (Oxford Brookes) has focussed on assessment. Here we have seen the adoption of a range of innovative pedagogies. Assessment is an area that is also witnessing technological advances, particularly from MOOCs and the use of quiz engines in VLEs that help engage learners. Introducing learning online without rethinking assessment may be insufficient to drive change. This can be achieved through incentives or national reports highlighting good practice. In addition, strong emphasis should be placed on developing learning design tools and approaches. Where these approaches have been adopted there is a tendency to implement innovative approaches and the appropriate use of technology. This could be achieved through national best practice and exemplar-sharing programmes operated by the national technology and pedagogy support agency, or another entity in charge of this area.

3.24. *Building on the strong existing base of digital education, European and national metrics should be established to record the typologies and extent of online, blended, and open education at institutional and national levels. This would enable institutions to compare themselves with others and to monitor their own progress.*

3.25. There are metrics associated with a range of university statistics, such as the percentage of students completing programmes of study, the percentage of overseas students, the assessment of research publications, funding from research bodies etc. However, there are few metrics recording the use of technology in study programmes. For example, the Higher Education Statistics Agency in the UK (https://hesa.ac.uk) offers a wide range of reports detailing students, staff and institutions, but does not currently address the adoption of technology.

3.26. Such data is regularly recorded by HEIs themselves, which will have data for the number of courses presented through a VLE, the number of registered students on a system, activity logs and supported technologies. By making such data a return in a national system (allied to existing returns), a comprehensive picture of the extent, and the type of technology used in the mainstream of education can be developed. This allows both for a pan-European analysis and for countries and individual HEIs to compare themselves with the broader trends. The data collected by the VLEs represents a major source of information on student study patterns. Anonymised analysis of this data at the national and pan-European levels based on the data of leading universities would yield valuable information which could inform future approaches to learning design.

3.27. *National governments should consider requiring certification of university teaching practice, both initial and continuing (CPD), and that innovation in pedagogy and use of technology should be a core part of this certification. Certification can be used to support research into teaching and learning, which itself is an important part of raising the profile of university teaching.*

3.28. Such certification could be conducted through national agencies, or in accordance with a framework, by the HEIs themselves. Such certification may act as a tool to drive innovation by specifying certain requirements in consultation with the sector. It could also serve as a legitimising force, helping to raise the profile of teaching and the use of new technology.

In the Netherlands, universities have agreed on a certificate of teacher competencies for higher education. The programme for obtaining this certificate is defined by each university, but certificates are mutually recognized. Some 20% of the programme is related to new modes of teaching and learning.

In the UK, the Higher Education Academy (https://www.heacademy.ac.uk/professional-recognition/hea-fellowships) operates a fellowship scheme which requires individuals to create a portfolio of evidence of reflective practice, demonstrating achievement of the competences defined in the National Professionals Skills Framework. Universities are required to report on the number of staff holding this accreditation. While there is no formal requirement for certification, many institutions require staff to achieve accreditation soon after taking up their appointment.

4. Quality Assurance

Context and introduction:

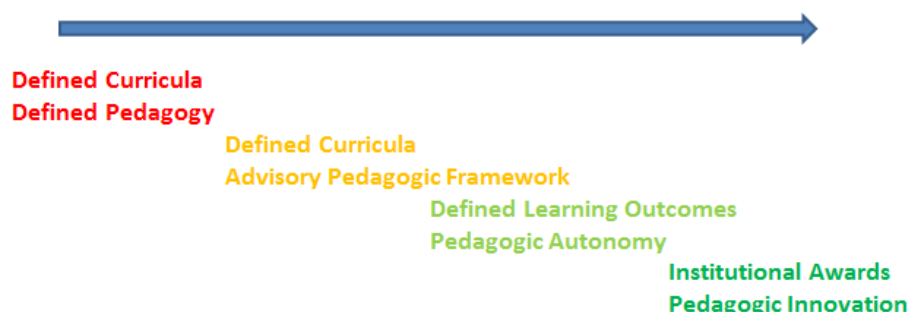## Quality, quality assurance and the evaluation of higher education provision

4.1. The concept of quality is complex for all but the simplest objects or processes, and is especially so when applied to university education. In the early years of quality assurance in the UK (or quality assessment as it was then called), Harvey & Green (1993) set out the different meanings that might be understood by the term "quality", and gave examples of how these would apply in higher education. "Excellence" and "fit for purpose" are two common, but sometimes conflicting meanings. More recently Gibbs (2010) reflected on what quality means in a more modern higher education context.

4.2. The rationale for governments to implement quality assurance (QA) systems or processes is usually two-fold: they wish to be assured that the higher education that they fund (albeit in varying ways) is of sufficiently high quality, and they wish to ensure that it is being continuously improved, ie quality enhancement (QE). In almost all European countries, quality assurance for higher education is achieved through the establishment of agencies (e.g. in Norway, NOKUT; in Poland, PKA & in UK, QAA).

4.3. These two purposes of QA and QE are probably always to some degree in tension with each other: it is difficult for a QA agency to be "policeman of quality" and at the same time be a "supportive locus for quality enhancement advice". The autonomy of universities in Europe, again varying in degree, is likely to lead them to be wary of incursions on their freedom of action, and reactions of university leaders to the introduction of a national QA system has usually been cautious. The tension between university autonomy and external regulation is reviewed in Henard & Mitterle, 2010.

4.4. The basis of quality assurance in European higher education is a binary approach based on internal quality assurance inside the HEIs (IQA) and external quality assurance provided by the independent national or regional quality assurance agency (EQA). Although HEIs have largely always applied some form of quality assurance to their education, at least in terms of appointing teachers in whom they had confidence and reacting to signs of problems through internal rectification, their processes were very informal and not transparent, nor could they be aggregated to the national level. In many developed countries, EQA was therefore introduced to change this situation in response to government perception of the need for transparency, and as IQA has matured inside HEIs, the form of EQA has been able to shift in some countries from detailed scrutiny of individual courses/programmes to high level evaluation of the effectiveness of the IQA processes being used in the whole HEI and the overall level of learner support and facilities, ie institutional review (Fig 3).

• *Progression to Maturity*

Enforcement of Standards   **Systems Enhancement**

Defined Curricula
Defined Pedagogy

Defined Curricula
Advisory Pedagogic Framework

Defined Learning Outcomes
Pedagogic Autonomy

Institutional Awards
Pedagogic Innovation

Currently a spectrum of approaches to QA with multiple entry points on the journey to maturity

Fig 3, The maturity pathway of higher education quality assurance

4.5. Operationally, external quality assurance can be of two types. The first is *ex ante* in which degrees cannot be offered without official recognition, and to be able to carry ECTS credits they have been pre-approved by the QA agency, and so in fact the QA process is one of accreditation. This approach is in use in Netherlands, Spain, Germany, Norway and Poland. The second type of EQA is *post hoc* in which an evaluation is made of the quality of delivery and out comes after the degree has been offered. Both approaches may be used together, or one only adopted (in which case it is only post hoc QA in all the case study countries in this study that used one method).

4.6. It is important to note that *ex ante* and *post hoc* evaluations of fully online courses are able to assess quality in all the teaching and learning materials (content) as these are created in advance, but also, importantly, *post hoc* evaluation is able to assess much of the process too, as this is generally captured and documented on the IT learning systems. Thus whereas face-to-face lectures and seminars in traditional higher education are completely ephemeral, those in online education can be given longevity by the use of technology. A similar degree of scrutiny of face-to-face teaching could only be applied by direct observation of classes, something that is little used.

4.7. In EQA, either a binary judgement of quality may be made (i.e. Pass/Fail) or a graded result may be given (e.g. Excellent, Satisfactory, Unsatisfactory). Where *ex ante* QA leads to an accreditation decision, then a Pass/Fail judgement is taking place.

4.8. Quality assurance was one of the main pillars of the Bologna process, launched in 1999 by the Ministers of Education and university leaders, which now encompasses 48 countries. The Bologna process aims to create a European Higher Education Area (EHEA) but does not attempt to unify national educational systems but rather to provide tools to connect them, in order to facilitate recognition of degrees and academic qualifications, mobility, and exchanges between institutions. The Ministerial meeting in Berlin (in 2003) strongly promoted a systemic approach to quality assurance and accreditation, and called for action to "develop an agreed set of standards, procedures and guidelines on

quality assurance, to explore ways of ensuring an adequate peer review system for quality assurance and/or accreditation agencies or bodies…" Gradually, in most European countries quality assurance and accreditation agencies were established. They may become members of the European Association for Quality Assurance (ENQA), which itself is part of the Bologna Follow-Up Group (BFUG), embracing the main actors of the Bologna process.

It is commendable that the national QA agencies have established such a member association at European level, for it can act to spread good practice and provide a focus for explorations ("R&D") into amendments to current QA processes so as to make them a better fit for the future higher education system. The several reports and studies that ENQA has produced are influential in shaping thinking in this field, and have been valuable to the desk research for this section of the Report. (The other areas of interest in this study, e.g. teacher training and accreditation, curriculum design, have no equivalent European association of national agencies.)

Quality Assurance and new modes of teaching and learning

"Are Quality Assurance frameworks sufficiently flexible to adapt to differentiated approaches? How are national Quality Assurance agencies involved in the definition and assessment of quality in MOOCs?"

4.9. A review of recent reports and presentations (many cited in this Section) about quality assurance in European higher education reveal an interesting disparity, namely that there are many more reports that focus on, or at least refer substantively to, technology in teaching and learning (i.e. online learning, e-learning, technology-enhanced learning etc.) than there are reports that focus on or substantively cover innovations in pedagogy per se. Section 3 of this study (Curriculum Design & Delivery) deals in depth with the very wide range of pedagogical options open to universities, but these are very rarely mentioned in most reports except where they are viewed as part of the use of technology. In reality, at the present time, innovation in pedagogy is mostly implemented by the use of technologies of some kind (e.g. portfolios, peer-tutoring, peer reviewing, problem based learning) and so often there is a shorthand use of the phrase "technologies in learning and teaching" to include pedagogical changes and innovations. This is not just a European issue; the many surveys and reports on educational innovation worldwide often document the extent of use of various technology tools but studies of the extent of use of particular pedagogical approaches are very rare (although some tools may embed a pedagogy, e.g. e-portfolios).

4.10. There is now, in addition, an almost-mandatory reference to "student-centred education", which is often left undefined, but very commonly in quality assurance and other standards-oriented reports and publications is closely linked to the use of learning outcomes, but often without specific reference to which pedagogical approaches might best support students to achieve them. Technology is clearly seen as one approach, and again, it may be that this use implies pedagogical innovations too. The paragraphs that follow should be viewed in that light, and although many of the reports and outputs quoted are focussed on technology they probably use this term in its wider sense.

4.11. Over the past five years, the European QA community, through its association ENQA, has addressed various aspects of technology and innovation in higher education as part of quality assurance process. They agreed in 2009 that e-learning should not be evaluated separately from traditional teaching and learning as in the future it would become a "natural" part of all higher education provision. However, there was a need for a common definition and understanding on all aspects of e-learning, a common language that would help higher education institutions and quality assurance agencies strive for the same goal. However, in 2010 (Grifoll et al, 2010, p45) they concluded that there was "*very little experience in the assessment of eLearning in Europe… [it] is rarely included as a regular or integral part of national quality reviews*", and that "*quality*" *assurance agencies should… develop assessment standards and benchmarks that would help traditional universities make the necessary internal transformations of* "*eLearning*". They noted again in 2012 that there was limited progress being made by QA agencies in addressing the changing landscape of higher education (Grifoll et al, 2012) and also that "*What must concern is the fact that agencies consider themselves not to contribute to the promotion of innovation in HE. At least this is seen as the second least important benefit for HEIs*". Quality assurance for transnational education, lifelong learning and online education were the lowest areas of importance for activity by the QA agencies surveyed. Whilst this might be understandable given the other pressures on QA agencies' time and resources, it does not help a modernisation agenda towards a fit for purpose 21st century HE system across Europe.

4.12. In 2014, ENQA members discussed the topic of e-learning again in their Zagreb meeting, at which European quality assurance instruments for online and blended teaching and learning were presented. There was discussion about how to promote excellence in the use of ICT in higher education, and how to prepare QA agencies to establish a solid methodological response. In the light of the current pressure to modernise European higher education this is a helpful activity, but concerted action to develop concrete measures and techniques are needed (see Para 4.14).

4.13. Despite these promising discussions in the European QA community, some recent documents and analysis reports about quality assurance in Europe have continued to take limited notice of the rapid expansion in higher education of the use of technology and its associated pedagogies. The implication is either that technology is so mainstreamed, and so well-accommodated by the generic QA frameworks and actions, that it needed little mention, or that it was "invisible" to the authors, or that they deemed it unimportant to QA.

4.14. For example, the European Commission's review of progress in quality assurance in Europe 2014 (EC, 2014b) acknowledges the importance of technology in the introductory section but then it receives almost no further mentions in the body of the report. Similarly, a study for the EC on quality assurance in higher education across Europe by Bertelsmann (2014) had little mention of the influence of technology in education on QA, apart from a section entitled MOOCs and distance education but that really was referring only to MOOCs. There is similarly little reflection on how quality assurance can stimulate innovation in pedagogies.

4.15. An important European document, and one in which the limited explicit recognition of the importance of technology and pedagogical innovation in education may have significant negative impact, is the European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). Until this year (2015), the ESG version in use lacked explicit reference to the role of technology in higher education and pedagogical innovation which was unfortunate, particularly as the ESG document is a reference point for quality assurance agencies in Europe and so is designed to be fairly long-lasting.

4.16. The latest version of the European Standards Guidelines for Quality Assurance in the European Higher Education Area (ESG, 2015) was approved in May 2015 by the Ministerial Meeting in Yerevan. It has made a clear step forwards in its recognition of the importance of technology and pedagogies in European higher education, and the statements in the opening paragraphs of the document are clearly in line with the desire for student-centred learning, with greater use of technology and innovation in pedagogy modernisation agenda. The revised section on student-centred learning and learning resources (2.3 & 2.6) in the internal quality assurance are an important improvement, although the extent to which HEIs adopt the flexibility that the new ESG offers, and change their approach to learning and teaching, will be key. One driver on HEIs in this respect might be external quality assurance, and indeed Section 2.5 states that: *"External quality assurance and in particular its outcomes have a significant impact on institutions and programmes that are evaluated and judged. In the interests of equity and reliability, outcomes of external quality assurance are based on predefined and published criteria, which are interpreted consistently and are evidence-based. Depending on the external quality assurance system, outcomes may take different forms, for example, recommendations, judgements or formal decisions."* Thus at national QA agency level approaches that seek and document examples of use of innovation in the curriculum are necessary elements in the support of the modernisation agenda. Indeed, more robustly, approaches to external QA that document absence of innovation would have even more impact. The revised ESG would itself therefore be able to exert greater impact on national QA agencies if its guidance to national agencies were less generic and promoted more expectation of them in search of evidence of modernisation. This is a difficult balance to achieve in a consensual process.

4.17. Change is particularly important in assessment, as the revised ESG recognises. Although much progress has been made in the higher education sector in innovation in use of technology and pedagogies for learning, less has been achieved in assessment, and some argue that this is a limiting factor. Put simply, learning online and being assessed in closed exams written on paper are in conflict, and assessment is well-known for shaping learner behaviours (Rust 2002; Stodberg, 2012, Aceto et al, 2014).

4.18. At the national level, some QA agencies have recently reacted to the need to be more public about their views of quality in digital education, and especially about MOOCs, where their failure to comment could be interpreted as indicating that they were «asleep to change» and hence to a degree irrelevant at a time of national debate about digital education. Examples of national QA agencies in the eight case study countries that did engage, promote discussion or directly commented on MOOCs are: France HCERES (HCERES, 2015), Netherlands NVAO (NVAO, 2014); Norway NOKUT (NOKUT, 2014), Spain-Catalunya AQU (AQU, 2013) and UK QAA (QAA, 2014). In the case of the Dutch QA agency, NVAO, their comments went wider than just MOOCs to encompass quality issues for online learning more generally. Their report is a model for engagement with the topic of online learning that other national agencies might emulate. The role of

the Dutch national government in stimulating this open discussion is notable, and comparable actions from national government have taken place in France, Norway, Catalunya, and the UK. In France the 2014 Bertrand Report (Bertrand, 2014), commissioned by the Ministry of Higher Education (MINES), has been very influential, and actions taken under the France Université Numérique (FUN) as a consequence of its ten recommendations. Of particular note is "integration of pedagogy in accreditation procedures" as the first recommendation.

4.19. In all countries where the QA agency has engaged in the debate, it has enabled much needed discussions with universities on quality in modern HE that is valuable to both sides. Similar engagement and discussion, with explicit and public outputs from the national QA agencies, are needed in all EC countries. ENQA's leadership is essential here to maximise harmony in advice and procedures, and ensure maximal sharing of experience.

4.20. As noted in Paras 4.9 and 4.10, generally these developments refer to digital education, i.e. use of technology, and therefore they do not necessarily translate directly into support for, and assessment of, the extent of innovation in pedagogies. It will be important for QA agencies, and ENQA, to ensure that they do not elide these two areas and they should address both areas explicitly.

4.21. Beyond the boundaries of the national and regional QA agencies, there has been a vigorous international exploration of frameworks, and development of rather precise guidelines, for QA in online, and in some instances, blended learning. In a few cases there has also been parallel development of processes for informal accreditation against the framework. Examples of such frameworks and recognition are E-xcellence (Williams et al, 2012a & 2012b; EFQUEL (2011), and eMM from New Zealand (Marshall, 2012). These have all been "road-tested" by interested universities, and have some robustness in their design and application. Useful reviews and compilations of e-learning quality frameworks have been published (European Commission/EACEA/Eurydice2014; Butcher & Wilson-Strydom, 2014; Bates, 2015).

4.22. That the digital higher education communities worldwide have felt the need to develop frameworks for evaluating quality in online and blended education demonstrates a perceived gap in support for this burgeoning activity. Technology is now mainstreamed in higher education, arguably fairly standardised, even if innovation in pedagogy is weaker, and so it might be expected that widespread use of common quality frameworks would exist. This appears not to be the case. Some evidence exists that HEIs have developed or are developing their own frameworks.

4.23. At the national level too, examples of guidelines and frameworks also exist, following a long tradition of quality benchmarks and criteria for distance learning. For example in France FIED has recently produced a quality guide (FIED, 2015); in the UK there is a Special Interest Group with support from UK agencies Jisc and Higher Education Academy (QAQE SIG).

4.24. At the level of the universities themselves, a recent European Universities Association (EUA) study, which reported the results of a survey of online learning in member universities (Gaebel, 2014), showed recognition by the 249 respondent HEIs of challenges for them around quality for their e-learning provision, but that it was still an emergent area for them and for their QA agencies. Quality was a strong theme too for the League of European Research Universities (LERU) universities in their recent 2014 position paper on online learning in research intensive universities (Mapstone et al, 2014), and in the 2015 seminar which built on and extended it (LERU, 2014). Concern appears to be of two kinds: one is whether online fully education can (ever) be of equivalent

quality to face-to-face education, and the other a more practical concern about how to ensure high and equivalent quality.

4.25. The 2014 EUA study of the extent of use of technology in European university education showed that only a quarter of QA agencies gave special consideration to digital education and less than one third reported a discussion about digital education in their country that involved their QA agency (Gaebel M, 2014). Although all the case study universities in this study reported that they deployed technology in education to enhance quality in some way or another, in the EUA survey only half thought that this did enhance quality and no clear metrics for evaluating quality increases were offered by our case study universities.

4.26. In contrast to views that national or regional QA agencies should take the lead in promoting new and effective forms of quality assurance for online education, the League of European research universities in its valuable discussion paper (Mapstone et al, 2014) proposes that the lead should be taken by research-intensive universities. This position reflects the tension noted above regarding a wariness of universities towards external QA. This can be resolved to a considerable extent by an open dialogue between the agencies and the universities (or at least their associations).

4.27. Set against this worry about how to assure quality in the use of technology in higher education is an explicit position by most universities, including those in the case studies for this report that the primary reason for using technology in education is to achieve higher quality, especially in the context of the first decades of the 21st century. The High Level Group on the Modernisation of Higher Education Reports (EC, 2013, 2014) made this same point, and repeatedly acknowledged the role technology can play in enhancing and maintaining the quality of European higher education.

4.28. Student associations too have expressed interest in e-learning, and reflect the two-sided view of technology and quality: its role to enhance but alongside this a fear of lessening of quality, implying the need to actively address this risk (NUS, 2010). The European Students Union expresses its view of the need not only for technology, but also a desire to see a move to new thinking on pedagogy (and hence implied better quality) in the title of its response to the Modernisation of Higher Education Report; "*the future of higher education is blended and student-centred*" (ESU, 2014). They also expressed a concern about insufficient innovation by universities in their third QUEST report (ESU, 2012) and that too heavy regulation of the learning process leads to less innovation, which is undesirable as "*innovation is also a part of quality education*".

4.29. Furthermore, a group of digital education experts who completed the Delphi survey as part of this research, provided responses to a series of statements which focused on some of the barriers, challenges and requirements mentioned above (Appendix 3). The relationship between technology, quality and delivery was brought to the fore in relation to curriculum design and taking advantage of technologies, as respondents ranked these features highly (statement 6f and 6g of the survey). In addition, the experts were asked to select a number of measures which showed progress towards embedding technology in higher education and the top ranking measure was one that illustrated the importance of quality in relation to e-learning approaches in higher education ("Universities have an e-learning strategy that is widely understood across the university and is integrated into the overall strategies for institutional development and quality improvement" - statement 9b, Appendix 1).

4.30. Finally, the e-learning academic community worldwide has had quality as an agenda item since it became clear that e-learning was not a passing phase in the early to mid1990's. Journals publishing in the field of e-learning have a steady flow of quality challenges in their publications. Recent examples are the complete issue of the Journal of Computer Assisted Learning devoted to this subject (Ehler & Hilera, 2012), and a book on international perspectives by Jung & Latchem (2012). Individual papers have also addressed quality in respect of online learning, including MOOCs (e.g. Ingolfsdottir, 2014; Ossiannilson & Landgren, 2012; Margaryan et al, 2015), and a Google Scholar search (as part of this study in late 2014) using the term «quality assurance e-learning» returned approximately thousands of individual articles (and that is only for English language journals). Thus concern with, but importantly shared experience of exploring, quality in e-learning is widespread.

4.31. It is therefore clear that higher education institutions, their staff and students, and the quality assurance agencies all have concerns about relevant and effective quality assurance for online and blended education. They are still in the beginning of a transition period, which has to be accelerated to fully exploit the opportunities of new modes of teaching and learning and to keep track with the international developments in higher education. Clearly, the MOOCs movement has stimulated awareness.

4.32. QA agencies should be closely involved in national programmes and explorations of digital education and new pedagogies, as should ENQA at European level. Evidence exists that some of this is already taking place, and this is to be welcomed. As an organisation, ENQA is, and has been, a partner of several projects to explore quality issues in the use of technology and associated pedagogies in higher education (e.g. E-xcellence Next; SEQUENT; EQTEL). Some of this exploration is still on-going and it will be important to maintain progress for learning from this work to explicitly inform the work of ENQA and especially its national members as they support universities and colleges in their countries. Explicit statements about innovation in technology and pedagogy are important signals, for example in publications, conference presentations, and websites as a way of guiding higher education stakeholders to the evolving thinking of the equality assurance agencies. A small number of good examples exist (NVAO, 2014; QAA, 2014) but these should be much greater in number, and a continued leading role for ENQA to support such progress, and to encourage good practice right across the European QA community, will be vital.

Quality assurance and accreditation in four areas of higher education provision

"Are Higher Education Institutions adapting their accreditation mechanisms to new online or blended provision or are the same approaches used for traditional and ICT enabled or enhanced provision, and what are the implications of this?"

4.33. In the Introduction to this report, four different areas of higher education provision were defined: Degree programmes; Informal diplomas, certificates and short courses (CPD, CE and LLL); open education, particularly MOOCs, and non-traditional higher education providers. Increasingly, although to varying extents from university to university, technology permeates them all.

4.34. Degree (Bachelor and Masters) education is regulated by governmental rules to different extents in different European countries. The Bertelsmann report notes that there is no comprehensive study of how QA operates in the EHEA (Bertelsman, 2014), and this is at the "top level"; timescales, responsiveness, agility, panel compositions etc., which can have a substantial impact on the behaviour of universities is even less well-documented. For example, in Lithuania and Poland, the national QA agencies evaluate degree programmes ex ante and

post hoc, as well as providing institutional evaluation, whereas Spain does both these forms of evaluation plus evaluation of university teachers. In the UK, new higher education providers are evaluated by the national agency but thereafter only post hoc evaluation is carried out and at institutional level. Universities in all EU countries formally have autonomy to design and offer degrees, but the extent to which they are able to offer them "officially", i.e. with national recognition and with the possibility of ECTS credits may be subject to constraints, and these vary between EU member states. For example, in Poland, not only can universities accredit traditional, blended and online degrees, they may also recognise and accredit learning by open education if they choose to do so. In Spain there is a classification of "informal/non-official/internal qualifications" whereas in the UK all university qualifications are "official".

4.35. The quality assurance process is operated by the higher education institutions themselves (internal quality assurance) and is evaluated and recognised by the quality assurance agencies (external quality assurance). Increasingly, there is a shift in national quality assurance systems of responsibilities from the agencies towards the higher education institutions, and from individual degrees to institutional evaluations ("quality audit"). Agencies will increasingly develop procedures for institutional quality assurance, and within this framework, institutions have to demonstrate that they assure the quality of their degree programmes according to agreed criteria. Universities appear to be using same QA and accreditation processes for all forms of credit-bearing provision, especially as their experience and confidence with digital education increases. No case study university offered an alternative approach.

4.36. However, this is a high level view and on the ground, any detailed evaluation of quality for fully online or blended courses must be drawing on both internal and external experiences of what is good quality (i.e. it works well, produces good quality learning outcomes, and has high satisfaction for both students and teachers).

4.37. Where ex ante QA operates (e.g. Netherlands, Spain), the QA agencies are using the same generic frameworks to evaluate quality as they use for traditional courses: no examples of specific frameworks or modifications to generic frameworks were found to be in use in the case study countries. However, the same accommodations must also apply for the QA agency: in practice, its staff and its external reviewers must be drawing on prior experience of quality in digital education else they would not be able to assess the quality of any online or blended degrees presented to them. Thus it is only in the detail of evaluations that one will observe the adaptation of QA systems to the emergence and mainstreaming of digital education. This conclusion aligns with our own personal experience of many years in higher education in three EC member states, and close connections with many colleagues across Europe.

4.38. Legal frameworks are largely permissive of the introduction of digital education in all the eight case study countries, and state that different forms of education (traditional face-to-face, blended and distance) are all valid. In Lithuania, this is quite recent, and only in 2012 was distance education recognised as a valid form of higher education provision for ECTS-bearing degrees. In 2014 in NWR Germany, campus-based universities were first permitted to offer formal part-time study towards degrees, and formally encouraged by law to offer online courses. However, some examples of conditions being imposed by governments on non-traditional education are also present. For example in Poland, there a restriction that only 60% of a course may be delivered online as this is considered to be sufficiently flexible while maintaining quality, but importantly, that examinations must take place physically in the university.

4.39. The very widespread use across Europe of substantial amounts of technology in predominantly face-to-face university degree education has suggested that recognition and accreditation of such blended education has not posed a major barrier for universities. Likewise the expansion of fully online degree programmes and credit-bearing courses indicate that, in general, no formidable obstacles exist. Quality assurance evaluations (both ex ante and post hoc) have therefore adapted to these new provisions, and, at least formally, the qualifications have the same value to the learner. The European Diploma Supplement (EDS) has a section (4.1) for teaching formats, including e-learning and distance, so that it too can accommodate, and record, a variety of modes of teaching and learning.

4.40. To assume that the accreditation process has only recently faced a requirement to address innovation would, anyway, be too simplistic. Various methods of teaching that do not need to utilise technology already existed that required these QA processes to be flexible and adaptable. Problem-based learning and enquiry learning are just two teaching formats that broke away from the classical lecture-seminar-laboratory model, and are in fairly common use (Boud & Feletti, 1999; Kahn & O'Rourke, 2004).

4.41. There is very limited evidence in the public domain that suggests there have been substantial revisions to university accreditation processes. It is likely that many universities had to think carefully about how they ensured that the quality of their provision would remain at a high level whilst introducing technology, and clearly uncertainty about how to do this still exists for some, perhaps to a degree, all (Ingolfsdottir, 2014; Mapstone et al, 2014). The more advanced is the use of technology, and especially for the assessment of groupwork, reflective writing and creativity, the more challenging defining quality measures will become (Collis & Moonen, 2008). Internal approval processes require internal understanding of what quality means in new forms of education, and external approval processes require the same of external reviewers.

4.42. An insufficiently acknowledged, but important, source of experience in those countries which possess them is the Open Universities. Examples exist in the Netherlands, Germany, Spain and the UK. They are widely recognised, by government, QA agencies and universities, for the high quality education they provide, which is now substantially, if not mainly, online. However, especially in countries where these universities draw their cadres of tutors from existing teachers in local universities, they are also directly training them in, and exposing them to, distance education in a blended or fully online form. Similarly, where virtual universities have been established (e.g. Bavaria and Ruhr VUs in Germany; Finland, Lithuania, Norway) these have provided a quality assured locus for teacher experience and training, which can then be applied back in the teacher's own university.

4.43. Finally, many, if not most, universities in Europe have "digital education expert centres" (their names vary greatly). Seventeen of the 19 case study universities have them, and as did 75% of universities in the EUA survey (Gaebel, 2014). The professional staff and academic staff in these centres are usually very active in national and international digital education communities and thus can draw on and share experiences related to quality issues. Members of these e-learning communities may well also be aware of the several e-learning-specific QA frameworks that have been produced (e.g. E-xcellence, EFQEL, eMM) and their informal evaluation of their work may well be informed by them. Thus the extent to which many universities (at least potentially) understand "how to do quality in digital education" may be higher than might be supposed from public statements and worries. However, it is also clear that re-invention of wheels takes place,

with universities independently designing quality frameworks for blended and online learning, and at least one example was evident in the case study universities.

4.44. Very many, perhaps now most, universities have felt it necessary to develop centres of expertise in digital education and new pedagogies (Gaebel, 2014, p39), and 90% of the case study HEIs in this study have them. They often employ a new type of para-academic staff, variously named (in English) "learning technologists", "e-learning advisors", (in Spain) "soportetecnopedagógico". That HEIs felt the need for internal expertise beyond that acquired by individual professors is a demonstration of the importance of this area to them but also of the need to ensure this expertise is present and available to support their core learning and teaching business. It can be argued that, by analogy, the quality assurance agencies, whose role is to assess quality in the learning and teaching business also need at least some of this expertise, which they might best obtain by also having such staff in-house. Although quality assurance panels could be configured to always contain knowledge of digital education and new pedagogies, or it could be included by very close working with other national or regional agencies with remits for these areas, if technology and new pedagogies are mainstreaming, and rapid change is taking place, in-house expertise is likely to be most efficient and effective. This model was proposed by the Dutch QA agency, NVAO, at the ENQA conference in Zagreb (Flierman, 2014), as was better co-working with national digital education and pedagogy agencies.

4.45. Continuous professional development, lifelong learning and non-degree education by universities is a very heterogeneous area of higher education provision as discussed in the Introduction to this report. Bertelsmann (2014) describe QA for this area as a "somewhat fringe topic", and define LLL as being "usually at EQF Level 5". However, as discussed in the Introduction to this report, advanced level CPD and training for the increasing number of graduates in the EU means that short courses at higher EQF levels are increasing. Where institutional, rather than individual course, evaluations are the major form of QA, assessing all forms of educational provision by an HEI is an option, and this appears to take place, at least when ECTS credit is being offered. No examples were found in the case studies of QA agencies operating ex ante evaluation for short CPD courses, although if these courses were also part of a degree (especially perhaps at Master level) then indirectly they are being evaluated ex ante and post hoc in all EU countries. Where the short courses do not form a part of a degree curriculum QA is solely the responsibility of the university offering them, although as noted later for MOOCs, this does not imply the likelihood of no QA scrutiny as all HEIs wish their reputations for good quality education to be as high as possible, and growing experience with QA for degrees may lead them to apply similar processes to short courses. In professional areas such as law, education, IT, engineering, clinical subjects, professional bodies may also be involved in recognising these short courses (or at least learning from them) as part of valid in-career training. The role of professional bodies is especially strong in the UK, but in many areas (e.g. chiropractice, physiotherapy, EU law) this is Europe-wide, and European associations exist to promote harmony and standardisation in post-qualification training. As demand for CPD/LLL rises, QA agencies need to explore how best to work with professional associations to promote good practice in QA for this form of higher education, especially at postgraduate levels.

4.46. MOOCs and other open education appear to be viewed by QA agencies as primarily the responsibility of the institutions offering them as they do not lead to a degree, or to ECTS credits. However, this does not mean that QA agencies have no interest in them, nor have no role to play, as described later in this section. The hype that surrounded the emergence of MOOCs in the US, and soon afterwards in Europe, often included an assumption that degrees would be awarded solely by study in these open courses (e.g. NY Times, 2012). In reality, very limited progress has been made so far in respect of even giving university credit for single MOOCs, although the topic is often discussed amongst those universities which offer MOOCs. Probably this limited progress partly stems from: lack of confidence in the methods available for being sure that the learner being credited has done the work (i.e. lack of the rigour in the assessments); partly from the very limited learning outcomes that can be achieved in short courses with 2-3 hours of study per week, and partly from the inevitable involvement of QA agencies and university validation processes that would be needed if credit were to be offered. Governments and QA agencies vary in their views on MOOC credits. In Norway, the government Commission on MOOCs is positive towards credit for them, and their report explicitly states that MOOCs can be included in the current degree system and recommends that HEIs review how they would deal with MOOCs under existing RPL procedures (NOKUT, 2014). In the UK, the QAA is more cautious and states that offering credits for MOOCs would bring them under QA scrutiny (QAA, 2014), and in the Netherlands, NVAO, although very engaged in the MOOC debate (NVAO, 2014), does not foresee MOOC accreditation under the Dutch system.

4.47. The possibility of gaining credit from study on a MOOC does exist, but to a limited extent. In the US, the ACE (2013) has approved a small number of MOOCs that were proposed to it by universities, and a few universities have offered credit for MOOC study, in one instance even up to the level of a degree (Antioch; iversity; UCLAN). The OER university (OERu) is an example of non-traditional universities that offer their qualifications through novel forms of study based on open courses and learning materials. They have limited recognition by accreditation and QA bodies, and so the value of their awards is uncertain.

4.48. There are also universities that specialise in offering recognition of prior learning as a substantial element of their approach to degree construction, and this is particularly strong in the US and Australia. MOOCs are seen by these universities as valid prior learning experiences, and amenable to RPL validation. The EC-funded OERtest Project studied and reported on various aspects of this area (OERtest). There is no clear evidence that the case study universities are offering RPL for individuals not students at their own university, however the locus for carrying out RPL inside a university may be quite devolved, and so not visible to this study. A deeper study would be needed by means of a survey, similar to that carried out by EUA regarding online learning in its member universities. To our knowledge, this information has not yet been gathered.

"To what extent are Recognition of Prior Learning (RPL) processes being used as a means to assess and award credit for MOOCs (and other open and non-traditional educational experiences)?"

4.49. RPL for open education is under active discussion in the e-learning communities, and has increased as the range of OER has expanded (including iTunes U content from traditional universities), as open courseware has matured, and finally as MOOCs appeared. Some explorations of how to enable learners to gain qualifications from open study were carried out in the RPL journals (sometimes called Prior Learning Accreditation and Recognition – PLAR). Where universities have limited autonomy to offer RPL and it is regulated (for example in Spain, where limits are set that would exclude MOOCs or other forms of open education), then they are constrained in their actions; where they are free to choose their own students and set their own entry criteria then they can also choose how to take account of prior (educational or experiential) learning.

4.50. MOOCs vary greatly in their level, content, and degree of demand of the learner. Some are very short, very light introductory courses, sometimes not in typical university degree subjects (e.g. Ignite Your Creativity, Coursera), whereas others are essentially full university courses converted into a MOOC format (e.g. Algorithmen und Datenstrukturen, iversity). Offering credit for the latter will have more face validity and also significant value to the learner.

4.51. In general, traditional universities have a strong incentive to protect their reputations. Mass cheating occurs even in traditional settings, but is not welcome. Until universities offering MOOCs have gained confidence in methods to verify learners and their work, through proctored examinations at test centres, online remote proctoring, and the use of biometric testing during assignment production and delivery, the great majority will move with caution on offering credit for their MOOCs. The additional modest income from most MOOCs will not be sufficient to change this balance for most universities.

4.52. However, universities offering MOOCs also have a very strong incentive to ensure the quality of their own MOOCs, as these are a much more of a public risk than are closed on-campus or online courses. Some universities have applied internal QA processes to MOOCs (e.g. Lund University, University of Edinburgh) for this reason. The quality of MOOCs was one important element considered in an EUA report in 2013 (Gaebel, 2014), featured in the LERU online learning report (Mapstone et al, 2014), and is given a framework for evaluating quality in the Open Up Ed project (Open Up Ed, 2014).

4.53. The quality assurance agencies in some countries have shown an interest in MOOCs from their earliest days (e.g. Netherlands, Norway, Spain, UK). In part this may have been in reaction to predictions of credit-bearing MOOCs, but more generally, as for the UK QAA, because all higher education provision is seen as part of the "national higher education service" and so low quality MOOCs, like poor quality degrees, reflects badly on the country. In Europe at least, this is seen as a problem, and so QA agencies protect the "national brand" (QAA, 2014). This view may be especially true in countries where international or transnational education (TNE) is of great interest and concern. Interestingly, this concern for national brand does not seem to feature as much in the US, perhaps because diversity of quality there is already enormous, QA isn't operated at federal level, and international higher education is not a top federal priority.

4.54. Finally, forms of quality control are also enforced by the MOOC platforms (for example Coursera, FUN, Futurelearn) as poor quality MOOCs will damage their reputation and hence pose a business risk. Most of the platforms carefully select their partners to assure themselves, insofar as is possible, that they will be offered quality MOOCs to host.

4.55. By contrast to the general lack of credit and recognition of learning from MOOCs, offering MOOCs to enrolled students as part of their university degree curriculum is feasible and does take place (Antioch). These learners have been selected by the university and are known individuals, are amenable to modest additional testing for their knowledge and skills acquired on the MOOC, and indeed may be given additional tutoring on campus. Examples of this approach are now quite common, and are probably increasing in number. At the extreme, this approach begins to merge into the small private online course (SPOC), as the enrolled students of the university may be given additional support and assessment and are therefore closer to a special closed cohort. This is also therefore a form of blended learning, and the use of MOOCs as separate online courses for on-campus students is likely to grow amongst MOOC providing universities as they seek to gain more value from their investment in their MOOC developments. There is some evidence (e.g. in Delft University) that students are asking about credit for MOOCs.

4.56. It is important to keep in mind that MOOCs are changing rapidly; technically, pedagogically and organisationally. MOOC platforms are exploring different forms of MOOCs in an attempt to find more learners and hence more potential revenue. For example, Coursera has begun to offer its MOOCs as "always on", i.e. not in a sessional format but as courses that never close and to which learners can sign up and start whenever they wish. MOOCs that form a series, i.e. a mini-curriculum with a "capstone" MOOC are also under test. Some of these formats will make credit offers more attractive.

Non-traditional higher education providers

"To what extent are new and different providers entering the higher education scene e.g. private companies, and sector-specific professional higher education? Do these remain outside the traditional frameworks and to what extent do statements of achievement or certificates issued by these providers have currency for further learning at other institutions?"

4.57. The expansion of non-traditional providers of post-compulsory education was reviewed in the Introduction. As noted there, most providers remain outside the credit frameworks and do not offer degrees or ECTS-bearing certificates or awards. However, in some countries, the UK and Spain being the most active, new higher education providers can gain degree-awarding powers and operate alongside universities. When they do so, they are subject to the same quality assurance and accreditation regulations as local universities, regardless of the mode of teaching that they use (i.e. face-to-face, blended or fully online). Beyond these recognised new higher education providers, the other organisations which offer advanced education mainly do so in subjects such as law, IT, business and para-clinical subjects. It is difficult to generalise about the value of their training and certificates, whether for the workplace or as entry into formal higher education. Because these providers generally do not map their awards to a qualifications framework, the assessment of many of them as part of higher education is problematic, however, their advanced awards sometimes require a first degree in that or a related subject which suggests at least EQF Level 6 awards. As noted above, in some areas recognition of their value derives from a professional body, but for subjects outside those with such a body, there is no externally-imposed quality assurance available. Rather like activities such as choice of hotel or airline, *caveat emptor* applies and consumers may increasingly turn to ranking sites and recommenders ("folksonomies") for guidance.

4.58. Traditional publishers are among the most active in seeking openings to provide education and training, both online and through their creation and ownership of private universities and colleges. Pearson is perhaps the best known example. Companies specialising in education and training with a worldwide reach are also appearing and are growing. Apollo is perhaps the clearest example of such an organisation. The transparency and portability of awards offered by non-traditional providers, including into further formal higher education study, would be aided by the assignment of ECTS credits, with the concomitant use of learning outcomes, transcripts and course descriptions in a standardised formats, as is done by some universities and independent trainers using university recognition and accreditation.

4.59. As transnational education grows worldwide, an increasing number of EU citizens will take online courses and degrees from HEIs outside the EU. These qualifications are not recognised as part of the European HE framework, and do not carry ECTS credits, however, they will be open to recognition by EU universities as potentially valid as the basis for further study, in just the same way as residential study at any university outside the EU would be. A major source of such education is likely to be the US, although data on the number of non-US citizens studying online with US universities is very limited. One form of such online international study is clearly seen in MOOCs, where many EU citizens are studying non-EU sourced MOOCs (~25% of edX and Coursera enrolments). If a non-EU university were to offer its own higher education credits for such study, these would at least be eligible for consideration in RPL processes, especially if they were already recognised by a national quality assurance body.

Recommendations for policy makers at the level of higher education systems: Quality Assurance and Accreditation

4.60. *National governments must review their legislative and regulatory frameworks and practices for quality assurance and accreditation in higher education (including recognition of prior learning) to ensure that they encourage, and do not impede, the provision of more flexible educational formats, including degrees and other ECTS-bearing courses that are fully online.*

To enable European higher education institutions to participate in the worldwide expansion of online transnational education and for them to address the European need for a more flexible higher education system including part-time, mobile, student-centred and more personalised study, national governments must review their legislative and regulatory frameworks and practices for quality assurance and accreditation to ensure that they do not prevent or impede increased use of technology and innovation in pedagogies. In some of the case study countries this was a very recent change [para 4.38].

This will include policy guidance to: quality assurance agencies to review their operating practices to ensure that these are not, or (importantly) are not perceived by universities as, inhibitory [paras 4.38, 4.28; 4.26; technology and pedagogy support agencies (and creating these if they do not exist) to ensure that their work is effective and that objective measures of impact are being taken (Section 3, Recommendation 3). To maximise the extent to which individuals can benefit from open education opportunities as part of their education (at any level), legislation and regulation should be reviewed to ensure that it enables and promotes the use of Recognition of Prior Learning by universities to evaluate and recognise such learning [para 4.49].

4.61. *National QA agencies should develop their own in-house expertise and establish processes that are sufficiently flexible to include recognising and supporting new modes of teaching and learning. They should evaluate institutions on their active support of innovation (or importantly, the lack of it), and its impact on the quality of teaching and learning.*

National QA agencies and ENQA should ensure that they have in-house expertise in new pedagogies and use of technology in higher education. They should also ensure that their QA panels contain an appropriate proportion of external reviewers with expertise in these areas [paras 4.41; 4.44; 4.32].

All national QA agencies should indicate their interest toadopt an explicitly encouraging attitude to innovation in both pedagogy and use of technology in higher education in their documentation and statements [paras 4.14; 4.15; 4.16]. Therefore, where not currently part of their approach to quality assurance in higher education, all QA agencies should actively seek examples of innovation as part of their search for excellence, and should acknowledge of quality enhancement as well as quality assurance in their work [para 4.11]. This will be particularly important where the institution rather than the individual degree is the subject of evaluation. To promote awareness of these examples of innovation, QA agencies should work closely with other national and, where appropriate regional, agencies concerned with supporting innovation in pedagogy and use of technology.

Drawing on their in-house expertise, and that of other stakeholders, Quality Assurance agencies should develop criteria that explicitly recognise new modes of teaching and learning [para 4.43]. These should be complementary to existing frameworks, for example those developed by the international e-learning community, and should provide institutions with practical guidelines for their internal quality assurance for blended and online courses and programmes. Quality assurance and accreditation criteria should be adapted to the specific contexts and needs in the areas of degree education and the rapidly evolving areas of continuous professional development (including non-degree and short degree programmes) and open education (OER, MOOCs) [para 4.45]. The latter should be considered as spaces for innovation and experimentation, where ex-post assessments are most appropriate and where slow ex ante approval is inhibitory [para 4.46]. Evaluations should promote a quality enhancement culture, stimulating and rewarding new educational developments.

A clear message from all evidence gathered for this report was that recognising academic staffs for their involvement in educational innovation, and providing suitable training for them, are essential prerequisites for progress (Section 3). The external quality assurance process should therefore take into account provision by HEIs of incentives for academic staff to undertake training for new modes of teaching and learning, and the extent of uptake and impact of such training. Alongside this, quality assurance agencies might consider the extent to which HEIs reward teaching alongside, and in parity, with research as part of excellence monitoring.

4.62. *ENQA and other relevant European networks should support the sharing of good practice by national QA agencies in the development of criteria on the recognition of new modes of teaching and learning.*

ENQA and other European networks and associations (e.g. EQAR) should promote an active dialogue about innovation in pedagogy and the use of technology with its members and other stakeholders, and seek agreement on the most appropriate measures of quality in innovation in teaching and learning in higher education [paras 4.18]. These measures might usefully be used by national agencies alongside the revised European Standards & Guidelines for Quality Assurance in the European Higher Education Area [para 4.11]. As a matter of urgency, at European and national levels, QA agencies should engage in active dialogue with universities and their associations to agree best practice approaches to quality assurance for innovation in learning and teaching. This dialogue should be aimed at producing public outputs that address not only the theme of technology and pedagogy in degrees but also good practice in quality assurance for open education [para 4.25].

5. Funding

5.1. New modes of teaching and learning will change the pedagogical landscape in all respects. In mainstream degree education, traditional modes are gradually evolving into blended formats and HEIs are aiming to achieve higher quality education with increasing student numbers and decreasing funding per student. New modes of teaching and learning also have the potential to break down the walls of higher education institutions and increase their outreach to new student groups through lifelong learning and international education. Finally, online technologies are opening up education, e.g. by offering open educational resources and MOOCs.

Innovation funding is required to accelerate these trends in all European countries. Such innovation must be embedded in a governmental policy aimed at stimulating the modernisation of higher education institutions.

However, funding levels are decreasing in many countries and some important geographical disparities are emerging. This may cause backlogs in innovation in higher education in many countries, presenting a challenge to the European Higher Education Area. How this will be reversed is not just a national, but also a European issue.

In order to ensure that this innovation is successful, national governments need to elaborate national strategies and provide dedicated funding. They have a range of funding frameworks at their disposal, which are well-suited as vehicles for responding to the changes in the pedagogical landscape, without necessarily increasing total funding to the higher education system.

Funding should focus on enablers of systemic change and provide direction and scale. Furthermore, because of the complexity and the cost of developing new modes of teaching and learning, new forms of collaboration within and between institutions are needed.

Government and institutional strategies have to reinforce each other as the cascade of policy actions takes effect (see 1.11).

Funding levels

5.2. In many European countries funding has not been favourable during the recession. Even now in most EU countries the levels of higher education funding are continuing to fall. According to the EUA Public Funding Observatory, the level of public funding between 2008 and 2014 showed a decrease in twelve countries, a relatively stable level of funding in four countries and an increase in six countries (EUA, 2014).

This variety is also reflected in the countries that were selected for this study. Only in Norway has funding increased at a rate higher than the increase in the number of students, which suggests a real investment per student. Poland is the only Eastern European country that increased the level of funding between 2008 and 2014, even in the face of decreasing student numbers (minus 9% between 2008 and 2012). In Germany the increase in funding more or less equals the increase in student numbers by 23%. France showed a slightly higher overall increase over the period from 2008 to 2012, just under 4% in real terms, while the student population increased by 7% over the same period. In the Netherlands the fluctuation in public funding since 2008 has remained within a

bandwidth of 5% relative to 2008 funding levels. Lithuania has dramatically cut its funding of higher education by about 36%, while the student population has dropped by 27%. In the United Kingdom the decline in subsidies for tuition in higher education by 36% has been compensated by a reform of tuition fees,and universities are now able to charge three times more than in 2012. This also happened in Spain although to a lesser extent, with a decrease of funding of 16%, which was only partially compensated by tuition fees.

EUA previously warned of the evolving geographical divide in terms of investment between European higher education systems. Predominantly Southern and Eastern European countries (with the exception of Poland) are suffering consistent cuts, from which many will find it difficult to recover. Hence the higher education landscapes in these countries may alter considerably in comparison to other European countries.

Fig 4, Expenditure per student, 2008 and 2011

5.3. The EUA Funding Observatory also showed an increase in student numbers between 2008/2009 and 2013/2014 of more than 10% in the 11 countries monitored, a growth of less than 10% in seven countries and a decrease in seven countries. In Germany, the Netherlands and Norway student numbers grew by more than 10%. In France and the United Kingdom there was still growth, but less than 10%. Student numbers have been decreasing in most Eastern European countries, for example in Poland and Lithuania. According to figures published by the OECD, which focus on expenditure in higher education between 2008 and 2011, expenditure per student has started to decline in many countries (Van Damme, 2015). European countries with a decrease in

expenditure per student are Germany, Spain, Norway, Belgium, Portugal, Austria and Ireland.

5.4. These facts are a challenge to the traditional higher education systems. With increasing student numbers and less expenditure per student, the quality of teaching and learning and the efficiency of higher education (teachers workload, study completion and study progress) may be challenged. Traditional modes of teaching and learning are reaching their limits. The case studies show that universities and ministries are convinced that traditional modes of teaching need to be combined with innovative teaching and learning solutions in order to overcome these limits and enhancing the quality of education for larger numbers of students in blended on campus education. For off-campus education or for international education, online education may help to meet challenges of flexibility, as is shown in the case studies of distance teaching universities and in documents and studies on flexible education in different countries (Kan Rinnooy, 2014; SURF, 2015; MOOCs Commission, Norway, 2015; FUN, 2015).

Funding frameworks

Are mainstream funding frameworks (e.g. funding formulae or performance agreements) sufficiently flexible to accommodate new learning modes in the established higher education sector? If not, what are the shortcomings and how do these differ between types of activity?

5.5. In most European countries, public authorities are the primary funders of higher education. Funding frameworks, in which budgets are channelled to institutions, vary from country to country (Jongbloed, 2010; Estermann, 2013). Universities are given the flexibility to accommodate new forms of teaching and learning, together with traditional education.

However, governments might specifically wish to stimulate new modes of teaching and learning in higher education in order to modernise the system and to keep pace with other countries. This might be targeted to improvements in the quality of degree studies through blended education, to respond better to the needs of society by flexible continuing education or CPD, to opening up education through OERs and MOOCs. Also, by online provision, higher education could be internationalised through networked curricula and online mobility and cooperation between universities and businesses could be organised.

Stimulating and activating higher education institutions to apply new modes of teaching and learning could involve various funding frameworks. Examples of all are found in the case studies.

Block funding

5.6. In most systems, public authorities distribute funds to universities through block grants, based on a funding formula with standard criteria to calculate the size of public grants to an institution. The formula includes input criteria (e.g. student numbers) and/or output criteria (e.g. the number of credits or qualifications awarded). Block funding or funding formulas leave little room for governments to implement an innovation policy (e.g. the implementation of new modes of teaching and learning), as the funding is awarded to institutions as a lump sum. There is no explicit connection with a government policy or strategy. However, in some countries, e.g. the UK, this formula is accompanied by negotiated institutional plans, which are evaluated on a regular basis and this can have an effect on future funding.

Performance-based funding

5.7. In order to steer innovation, some governments make use of performance agreements, mostly associated with block funding or a funding formula. These performance agreements, and the related indicators, may be negotiated beforehand with each individual institution. The aim is to commit the institutions to work to a governmental policy or strategy, as well as to tailor criteria to the strategies and ambitions of the institutions. Performance-based or conditional funding gives governments a good instrument for steering innovation. This is tailored to each university, while universities may themselves propose plans based on institutional strategies.

5.8. In the Netherlands, in addition to block funding more than 5% of the education budget comprises *conditional funding*, which is available only on the basis of a performance agreement between the individual university and the Ministry (applicable since 2012). Currently these agreements relate to performance indicators, such as teaching quality or study completion. In 2013, the review committee and the Minister of Education noticed that new developments, like OERs and MOOCs, or lifelong learning remained underexploited in the first agreements. It is expected that higher education institutions will propose the implementation of new modes of teaching and learning as benchmarks in the next round of performance agreements with the government.

In North Rhine-Westphalia, the state budget for the universities is divided into a basic and a performance-dependent budget. In the agreements on targets, universities commit themselves e.g. to creating a certain number of places or to educating more students within the regular time available for a particular study. So far, new modes of teaching and learning or MOOCs are not included in these agreements. At present this seems to be due to a lack of interest.

5.9. Remarkably, although in many cases performance-based funding focuses on the quality of teaching and learning, no good examples were found of the implementation of new modes of teaching and learning. Perhaps this is also due to a lack of indicators. Indicators might be related to the ambition of a university to build institutional innovation frameworks or the development of blended degree education, online continuing education and open education (MOOCs, OERs).

Project funding

5.10. Competitive and non-competitive project funding is commonly used as a way to fund innovation. It belongs to the usual instruments of university policy. Typically project funding is awarded to individual staff or groups of staff, possibly in an interuniversity context. Project funding is effective for a broad range of projects, from grassroots projects to frontrunner innovation projects. Sometimes, for academic staff, project funding is the only way of being involved in innovation. In the case studies it is reported on numerous occasions that there were problems relating to sustainability after the end of the project.

In many countries, the management of project funding is out-sourced by public authorities to agencies or intermediate organisations which specialise in the field.

5.11. Norway Opening Universities (NOU) was established by the Norwegian government to promote ICT-supported learning and flexible education. On behalf of the government, NOU administers annual project grants for blended learning, flexible education and cooperation between higher education and work.

In Spain, the Research and Analysis (BOE, 2003) programme organises projects in the area of teaching innovation and curriculum analysis (since 2003). At the

beginning these calls were mainly used to improve the curricula of degree programmes. Now they focus more on promoting education innovation (around €12 million in the last nine calls).

In the UK, public project funding in higher education is much reduced at present. UK funding opportunities are now very limited and universities must fund innovation mainly from their mainstream income sources. Earlier a series of Teaching and Learning Technologies programmes effectively provided funding for the development and evaluation of e-learning resources and pedagogies. As a consequence of the reduction in government funding, there has been a major reduction in the resources available to the National Subject Centres that acted as centres of expertise and resource curators in particular subject areas. In recent years their work had been coordinated by the Higher Education Academy (HEA). Some innovation schemes are probably now part of institutional plans which are negotiated annually with the government. In this case, funding will become part of the remaining block funding.

Targeted/earmarked funding

5.12. Targeted or earmarked funding is mainly used to support large-scale innovation involving large numbers of institutions. Hence large budgets are needed. It is often made available for priority areas or to compensate for the loss of other sorts of funding by universities (e.g. fees). Targeted or earmarked funding for specific purposes (e.g. knowledge transfer or the innovation in higher education) is allocated on a competitive or a non-competitive basis.

Although an enhancement of the quality of higher education systems is envisaged, no examples of good practice are available yet for the large-scale implementation of new modes of teaching and learning. However, this would be a valid area of focus in relation to quality improvement and efficiency gains.

5.13. The Quality Pact for Teaching (*Qualitätspakt Lehre*) of the Federal Government and the German states has introduced funding to ensure support for the improvement of the quality of teaching and learning in German higher education institutions. The Federal Government has earmarked about €2 billion for this campaign which will run from 2011 to 2020. This is a sign of a commitment to higher education teaching unknown in the history of German higher education policy. A total of 186 higher education institutions in all 16 states benefit from this funding. However, e-learning activities are not the main focus of most of the projects that were actually funded, but at best they have a supporting role.

In North Rhine-Westphalia, the annual funds for quality improvement (*Qualitätsverbesserungsmittel, Studiumsqualitätsgesetz*) amount to €249 million. They were introduced to compensate for the absence of tuition fees from 2011/2012 at universities in North Rhine-Westphalia. These funds for quality improvement are distributed to universities according to the number of students and are an addition to the universities' basic funding. They are not meant to raise the basic capacity of universities, but have to be used for additional human resources, such as hiring teachers and tutors. However, new and innovative modes of teaching and learning are not mentioned in the law.

Funding for excellence

5.14. Funding for excellence is mostly practised in research, although the scheme is also valid in education, in particular when aiming at supporting frontrunner innovation. As in the case of research, such schemes are implemented on a competitive basis. Their horizon is systemic change. They focus mainly on the development of wider institutional strategies (comparable to the excellence initiatives in Germany and France). Excellence schemes are aimed at having an impact at the institutional level or even at the level of the entire sector of higher education (Bennetot Pruvot and Estermann, 2014). In some countries (e.g. NL), there is a clear demand for funding of excellence for frontrunner institutions, which take the lead in innovation, without neglecting the need to promote innovation at other universities.

5.15. The French "*Initiatives d'excellence en formations innovantes numériques*" (IDEFI-N) are part of the "*Investissements d'Avenir*" action by the Agence Nationale de Recherche. In 2015 it aims to support fifteen ambitious projects which have sufficient reach and strategic impact to create a new dynamic of transformation throughout the higher education sector, based on new modes of teaching and learning. The projects are intended to strengthen the international attractiveness of French universities, promote innovative blended and online courses and boost the development of lifelong learning at university level. The projects last three to five years. The IDEFI-N initiative has been active since 2010 and it has a subsidy of €12 million. It is open to partnerships between universities or between businesses and universities.

Concentration and collaboration

5.16. In many European higher education systems, public authorities and/or universities are in the process of merging institutions (e.g. in France and Norway). Merging affects the policies and strategies, the size and the organisation of institutions, resulting in scale effects, synergies and cost-effectiveness. Some other countries, like Lithuania have a large number of higher education institutions, of which some are rather small.

Increasingly universities are starting to collaborate of their own accord to realise synergies and scale effects in some areas.

Finally some governments stimulate collaboration between institutions through collaboration platforms.

5.17. The universities of Leiden, Delft and Rotterdam cooperatein the Leiden-Delft-Erasmus Centre for Education and Learning (LDE-Cel) in the areas of research and innovation with regard to new modes of teaching and learning. LDE-Cel cooperates with the teaching and learning support services and the research departments of the three universities. It has also created a professional teacher training platform which pays attention, for instance, to the design of active blended learning, online assessment and the effective use of video in blended and online education.

Likewise, cooperation between the three technical universities in the Netherlands (Delft, Eindhoven and Twente) takes place in the 3TU Centre for Engineering Education. This centre focuses, for instance, on blended learning (the flipped classroom, virtual labs, online continuous education and digital assessment).

In France the creation of university clusters "*communauté d'universités et établissements*" (COMUE) has energised the use of digital tools in education (e.g. the rapid evolution of the universities' LMS). It enables closer collaboration between universities of the same clusters, such as the COMUE Bourgogne-France-Comté in our case studies. The services of these universities now collaborate closely.

The French government created *France Université Numérique* (FUN). This is a national action programme, funded by the government, to support the universities with the implementation of new modes of teaching and learning in mainstream education, continuing education and open education. Actions are undertaken in cooperation with the universities. Examples of actions are: promoting successful study through a pedagogy supported by digital technologies; proposing an innovative offer of online training to meet the increasing needs of lifelong learning; exchanging and sharing professional experience; training and supporting teachers and teaching teams in the use of digital tools for their teaching practice; giving a strong impetus to research in e-education; and constructing more open and attractive universities in Europe and worldwide.

Capitalising on many years of experience with seven "*universités numériques thématiques*", FUN also offers the French MOOCs platform. FUN serves students with a wide MOOC offering and supports teaching staff by integrating digital pedagogies in courses and developing scholarship in the field.

Barriers to innovation in funding rules

5.18. Some countries still apply funding rules that might hinder the development of new modes of teaching and learning in the future.

5.19. In Poland the number of teaching hours provided based on methods and techniques of distance education may not exceed 60% of the total number of teaching hours within the curriculum for the specialisation and the level of study.

In the Netherlands, the so-called "location principle" may pose problems. If the institution offers its own (online) distance-learning courses, then those courses will be regarded as being delivered from the institution's location. If the institution makes use of distance-learning courses offered by other institutions, then those courses will be regarded as not being delivered from the institution's location. Current rules indicate that for a bachelor's degree programme, no more than one third of the curriculum may be provided from outside the institution's location without prior permission. For a master's degree programme, no more than thirty credits (for one-year programmes) or one third of the curriculum (for the remaining programmes) may be provided outside the institution's location without prior permission. The Dutch Ministry will change regulations if good practice were to be hampered.

What should be funded?

5.20. The funding policy of national governments should focus on activating higher education institutions to develop policies for innovation in higher education, engaging in each of the broad areas of development in higher education in the future: blended degree education, online continuing education and open education (See 1.31). Online and blended education contribute to the accessibility, flexibility, interaction, personalisation and scalability of higher education (Williams, Kear & Rosewell, 2012a, 2012b; Mapstone et al., 2014; Surf, 2015; Laurillard, 2014).

Engage stakeholders

5.21. Funding should follow clear visions, policies and strategies for higher education in a country. These should be shared by the actors in the education field and connect with the main drivers which move leaders, as well as teachers, forward. This is the basis for the dynamics of change in education.

A policy discussion should therefore take place among the main stakeholders, which in practice can be outsourced, for instance, to intermediate agencies, advisory committees, higher education associations, organisations for ICT in higher education and quality assurance agencies.

A shared vision is a preliminary condition for change and a rationale for funding. University case studies demonstrate that institutions want this from governments in order to be able to set their own priorities and also to motivate faculties and staff to invest in innovation. Institutional leadership is partially borrowed from relevant governmental leadership.

In the case studies, examples of shared visions and strategies were found in France (Bertrand, 2015), the Netherlands (SURF, 2015) and Norway (MOOCs Commission, 2014).

Strengthen enablers

5.22. Funding the transformation of higher education through new modes of teaching and learning should support the entire value chain needed to produce excellent teaching and learning in higher education institutions. In this chain, institutional leaders and teachers are key change agents. To be effective, government funding should therefore focus on the development of enablers of systemic innovation which support this value chain.

5.23. Enablers may change over time and hence require regular evaluation. A recent survey in the UK from a teacher-centered perspective on change identified the following enablers to ensure teachers and leaders could be innovative (Laurillard and Deepwell, 2014):

- *leadership support for innovation; support leaders who create an institution-wide innovative strategy and a continuously innovative environment, where staff are motivated to contribute to the system and are supported by teaching and learning services;*

- *teacher professional development; promote continuous professional development in online teaching and learning in blended education, flexible continuing education and open education, which are provided by the institution; develop career plans, which value professional growth and scholarship;*

- *learning technology tools, systems and services; support learning environments which are user-friendly and open to new pedagogies, with learning design, learning community and assessment tools, and deliver good technical support;*

- *communities of practice; promote the exchange of patterns of good practice by teachers, e.g. at the subject level;*

- *shareable resources; stimulate the development and use of open education resources and learning design tools, which will possibly reduce the cost of education and will enable teachers to build on each other's work;*

- *evaluation and research evidence; fund research and innovation to provide evidence on new modes of teaching and learning and produce tools for developing innovative practice.*

From the government's perspective, funding should focus first on a systemic approach to innovation, strengthening these enablers in the higher education system and in the institutions. This does not preclude governments from also funding individual teachers/scientists or groups in relation to experiments and innovative set-ups, sowing the seeds for future innovation.

Support frontrunners and also the majority

5.24. Frontrunners are needed to support systemic change. Frontrunner institutions show specific characteristics, which make the implementation of new modes of teaching and learning successful. They have strong leadership, which is able to create a climate of change. They develop strategies for innovation, capitalising on good practice and connecting with international movements like MOOCs. They create support structures for teaching staff who are invited to contribute to the system. They are able to allocate an innovation budget in support of faculties and central services. The entire leadership promotes innovation. Research and evaluative studies provide support and inspiration. This is the case for the universities of Delft and Leiden.

Case studies also show that frontrunner universities serve as a role model for other institutions in the country or even internationally (e.g. in the MOOC platforms). Institutions learn rapidly from each other, especially when they meet with others in expert groups and communities in intermediate organisations like SURF (the Netherlands), Openuniversitetet (Norway) or JISC and HEA (UK). If they received special funding, comparable with excellence funding in research, frontrunners are recognised and activated to play this role explicitly.

In contrast, the majority of institutions sometimes lack leadership or the scale to adopt innovation. Also, they are not as well connected with the international scene (e.g. with MOOC platforms). This is especially the case for smaller universities and colleges and they can learn from the frontrunners. This majority of HEIs need different performance-based or broader earmarked funding to take up innovations in a later stage.

It seems to be difficult for governments to find a balance between differentiating funding between frontrunners or early adopters and the majority of institutions in a higher education system, but the funding instruments are there (see 5.7 to 5.18).

Stimulate collaboration

5.25. Funding should also stimulate collaboration, synergies and scale, resulting in quality improvement and cost-effectiveness. Collaboration can occur within higher education institutions or between them at the regional or international levels. It can also involve other stakeholders, such as businesses.

Examples of such schemes are course teams, joint professional development initiatives, joint research and innovation programmes, professional communities of good practice, common technological infrastructures and learning design tools.

In the Netherlands, some universities of applied sciences are preparing for intensive collaboration in online teaching and learning in order to become more cost-effective and to overcome problems of scale.

5.26. In some countries, intermediate organisations play an important role in stimulating collaboration between universities. This is the case in the Netherlands (SURF), the UK (JISC, HEA), France (FUN) and Norway (Norgesuniversitet), all of which are at least partially funded by public authorities. In the Netherlands, SURF organises SIGs, with community building for experts in online teaching and learning. Earlier SURF worked on digital assessment with common item banks funded by the Ministry. In some government project-based actions, like the French IDEFI-N, collaboration has become a condition for funding, as is also the case with most European projects.

5.27. Currently universities which organise MOOCs contribute to the development of platforms, such as edX, Coursera or Futurelearn, which is beneficial for the organisation delivering the MOOC. However, the platforms also organise communities of teachers, state-of-the-art conferences and meetings of university executives. They discuss not only operational issues, but also new pedagogies for MOOCs, pathways for recognition and the awarding of credits and MOOCs as building blocks for new types of degrees. This is found in partner institutions such as TU Delft, Leiden, Sorbonne Universités, Edinburgh and a number of other European universities. Hence the partnership of MOOC platforms supports member institutions by providing strategic information, up-to-date expertise, communities of practice and joint policymaking.

5.28. It might be useful to develop national platforms for the exchange of course material and the delivery of MOOCs, to create communities of practice in blended and online education or to administer innovation projects with a systemic impact.

The scale of many institutions is too small and they are not able to make use of international platforms like Edx or Coursera. For this reason, some governments (e.g. in Slovenia and Norway) are preparing national platforms, as has already been done in France (FUN). These platforms are accessible to all national higher education institutions and will in time be accessible to students. In view of the diversity of languages and cultures in Europe and in contrast with the Anglo-Saxon countries, these platforms serve regions and countries, rather than having a focus on global outreach. They might be considered as a form of indirect funding to institutions or at least as a support to the institutions concerned.

Governments might evaluate what support platform they should organise at the national or, alternatively, the international level. The MOOC Commission in Norway suggested possible collaboration between the Scandinavian countries as a single language community. The same might happen between the Netherlands and Flanders.

5.29. Also in international partnerships and transnational education, new modes of teaching and learning increase the accessibility and flexibility of provisions, for example by organising joint virtual seminars, think tanks, discussion groups or joint degree programmes with related online/virtual mobility (De Moor and Henderikx, 2013).

Assessing the cost of new modes of teaching and learning

Are institutions encouraged to assess the cost of different types of provision (e.g. on-line, flipping the classroom, more interactive learning) and how are they rewarded for doing so?

5.30. Since universities have to operate at lower unit costs and with increasing student numbers, funding imperatives might become an important driver for change in higher education, making transparent costing models for online teaching and learning and the scaling up of education necessary.

From this perspective governments might stimulate universities to assess the costs and benefits of blended and online education.

Costing and the related business models differ significantly between blended education in bachelor's and master's degree programmes, online and flexible continuing education and open education, including MOOCs. On the other hand, these areas are interdependent, also in terms of cost or staff time.

At the institutional level a holistic perspective is therefore needed to develop these areas in their own right, but also to integrate them into actual practice, where possible. Their respective business models should also be seen as complementary.

Basic assumptions

5.31. Generally the fixed costs for a course in online learning are expected to be about the same as those for traditional courses, while the variable costs per student are lower. Improved cost-benefit ratios are achieved partly by transferring activities from variable costs to fixed costs and realising economies of scale through higher student numbers (UNESCO, 2011). This implies that the number of hours spent by teaching staff should be reduced considerably (Rumble, 2011). Higher numbers can be achieved through re-runs of a course over a number of years.

Fixed costs can also be reduced through collaboration between staff in course teams or by re-using content from OERs. Alternatively a course can also be presented as an OER and partially re-used by others. Cost comparisons are actually difficult to make because of the relative impact of many factors (see the table below) and also because of the rapidly changing development in the cost of some of these factors, e.g. a decreasing technological cost.

Cost categories	Factors affecting	
	Fixed costs per course	**Variable costs**
Teaching activity	- Teaching and specialist staff design and development of resources and learning activities - Specialist staff for design and development - Reuse of existing resources and designed activities - Amount of formative evaluation and redesign - Updating and maintenance - Differential grades of teaching stafffor different teaching activities	- Group size for teacher guided activities - Cohort size for supervision and marking - Degree of teaching involvement in the types of teaching-learning and assessment activities used - Differential grades of teaching staff for different teaching activities
Teaching infrastructure	- Share of institutional physical and technical infrastructure - Staff development and support needs	- Group size for teacher guided activities - Cohort size for supervision and marking - Degree of teaching involvement in the types of teaching-learning and assessment activities used - Differential grades of teaching staff for different teaching activities
Administration	hare of administrative infrastructure for market research, marketing, recruitment, enquiries, enrolment, registration, QA, validation, accreditation	- Cohort size for administrative processing of enrolment, registration, student support, accreditation - Cost of student drop-out
Students» costs	Cost to student of course fee, equipment and materials	- Cost to student of access via travel, online communications - Opportunity costs of time spent on course-related activities other than studying

Table 1: Factors affecting costs of provision of all forms of learning (UNESCO, 2011).

Cost-benefit assessment

5.32. The use of models for cost-benefit assessments at the course level is complex, as many cost aspects are not related to one single course. Few institutions calculate the integral cost of a course, partly because instruments for this are not yet available.

To estimate costs and benefits at the course level, the London Knowledge Lab is developing the Course Resource Appraisal Model (CRAM, currently a prototype – see figure 5). It helps academics to construct a plan for improving learning benefits and costs. The instrument is specifically meant for those interested in costing the move from traditional to blended or online courses. The tool focuses on the costs linked to staff and student time, and the benefits linked to the types of learning and teaching. One of its principal advantages is that it enables innovators to plan and understand the relationship between the expected learning benefits and the likely teaching costs.

The model takes into account a long-term perspective, so that the fixed costs of the course can be allocated over several years to reruns, while the variable costs can be improved through innovative approaches to tuition, peer-group interaction etc. Compared with traditional courses, most e-learning courses are probably only cost-effective when the fixed costs can be set off against high student numbers and after several re-runs of the course.

Fig 5 Course Resource Appraisal Model Dashboard
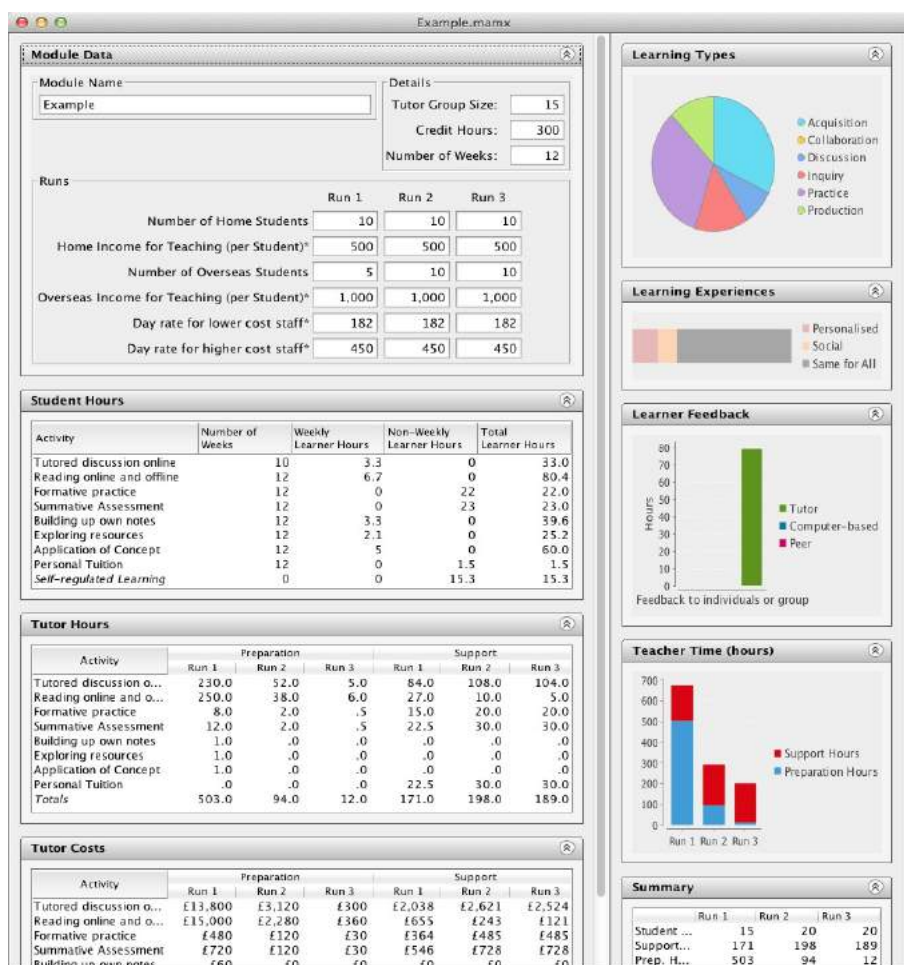
Three areas, but a holistic approach

Where continuing education and MOOCs generate revenues are universities permitted to use this income to cross-subsidise other education provision or services?

5.33. Costing and the related business models might significantly differ in the three areas of higher education defined as blended education in bachelor's and master's degree programmes, online and flexible continuing education/lifelong learning, and open education by means of MOOCs (see 1.31). This is because of differences in government funding and fees, differences in educational formats and differences in student numbers.

However, the three areas are interdependent and partially overlap, as the same staff and departments are involved in all of them. Flexible continuing education and open education are organised by the same departments and the same staff as mainstream education. Often continuing education and MOOCs are spaces for experimentation, creating a new dynamic in mainstream eduaction with blended and online teaching and learning. Courses or parts of courses are used in different settings or are based on the same content.

5.34. Institutional development in higher education should therefore embrace a holistic perspective, developing these areas separately, but also integrating them in practice. This perspective should take into account the institutional strategy and furthermore the national and international profile of the institution. Universities should have enough autonomy to determine this position and to act flexibly and rapidly in response to changes in society and developments in research. All areas are rendered dynamic or can only exist when they are supported by online, open and flexible learning models. As all contribute to the educational offering of a department and all have a specific function serving different student groups, the business models should be seen as complementary. It is important that income generated in non-regulated areas (continuous education and MOOCs) serves as an incentive for teaching staff and departments to keep innovating in these areas and in mainstream degree education.

5.35. At TU Delft, ICT became an enabler of new educational sectors for the university, reaching out to the region and globally. New sectors are developed through new modes of teaching and learning, such as online CPD, online international master's degrees, OERs and MOOCs. Through this approach the lifelong learning and CPD policy of the university becomes more systemic and less dependent on individual staff taking initiatives mainly on a small scale with local outreach. With new methods, it is possible to serve many more students around the world. The sectors of LLL, CPD and international education have become financially very important to Delft, as changing demographics will result in fewer students, the funding per student is diminishing as a result of lower state support and these fees will come under pressure. Although Delft has grown in the past ten years, this growth rate cannot be sustained in the coming years by a university of technology (50,000 students is not realistic). New markets are therefore important to ensure the increase in staff needed for research. Incentive models for teaching staff in new educational sectors should support the departments to which the staff belong. Allocation models applied to R & D departments could serve as an example. Up until now these business models were not applied to education. A unit of business developers and account managers is now working in this new area to develop allocation models for education and training. In practice the offering of LLL/CPD courses will be very diverse, ranging from free MOOCs to more expensive training, both with a regional and a global outreach.
Beyond this, tailormade programs will be organised on demand for companies. The business models will therefore be very different from that of the past.

Recommendations for policy makers at the level of higher education systems: Funding

5.36. *Governments should consider prioritising innovation in their funding approaches, using funding mechanisms such as performance-based funding, funding allocated to large-scale innovation, and funding for excellence, in order to invest continuously in modernising their higher education systems and stimulate early uptake of innovation and new pedagogies.*

European countries have a variety of funding frameworks, revealing different ways of stimulating and activating innovation with different purposes. They include block funding, performance-based funding, competitive and non-competitive project funding, targeted or earmarked funding and funding of excellence.

Depending on the objectives of the governments, these funding frameworks are all valid and fit for stimulating innovation through new modes of teaching and learning. Many countries use one or more of these frameworks to support innovation, but in others, this agenda is not shared by policymakers. Some European governments do not practice any funding policy with regard to innovation and new modes of teaching and learning (see 5.7 to 5.18).

5.37. *To be effective and systemic, this funding should strengthen the enablers of innovation at the system level, including - leadership for institutional change, learning technology tools and course design, professional development of teachers, communities of practice, the development of shareable resources and the support of evaluation and research evidence. Collaboration within and between institutions should be stimulated.*

The funding policy of national governments should focus on activating higher education institutions to develop innovation implementation policies, engaging in blended degree education, online continuing education or open education (see 5.21). In order to reach this goal, funding should primarily strengthen the enablers of innovation, which are needed by teaching staff and leaders to be innovative and by the institutions to realise a systemic and sustainable impact. The main enablers relate to leadership for systemic institutional change, the professional development of teachers using new pedagogies, learning technology tools and services for course design, communities of good practice, shareable resources (e.g. OER) and support for evaluation and research evidence. Collaboration within and between institutions should be stimulated, e.g. in course teams and the creation of rich learning environments (see 5.24).

Collaboration within and between institutions should be stimulated to raise the quality and to augment scale effects and cost-effectiveness (5.26 to 5.30).

Governments should find a balance by differentiating funding between frontrunners or early adopters and the majority of institutions in the system (5.25).

5.38. *Governments should stimulate higher education institutions to assess the costs and benefits of blended and online education, in order to maximise their effectiveness in making use of new modes of teaching and learning for degree studies, as well as for continuing education and open education.*

Cost assessment is an important aspect of institutional policy. Since universities have to operate at lower unit costs and with more students, funding imperatives become an important driver for change in higher education, making costing models for online teaching and learning and scaling up the education needed (5.33-5.38).

Governments should stimulate universities to assess the costs and benefits of blended and online education. Such assessments would improve the understanding of all components of the cost. Universities should share this understanding. Costing and the related business models differ significantly between blended education in bachelor's and master's degree studies, online and flexible continuing education, and open education, including MOOCs. Institutional development in higher education should therefore embrace a holistic perspective, developing these areas in their own right, but also integrating them in practice, where possible. Their business models should be seen as complementary. The sharing of good practice will support universities in the further development of their educational provision in these three areas.

6. Conclusions

6.1. The context within which European higher education is operating is changing rapidly, and so are European universities, their staff and their students. Studies have shown that a substantial investment has been made in all EU countries in the technology infrastructure and the services needed for a modern higher education system. This varies, however, with regard to both duration and scale between Member States. At present, there is a solid base for universities to draw on for innovation in their education.

Effecting change in the higher education system

6.2. The pace of change from traditional teacher-centric to more student-centric and flexible education has been slower than many policymakers and educators would prefer. A large-scale transition from the old to the new has not taken place. Moreover, despite the widespread uptake of ICT, substantial gains in efficiency and effectiveness in the HE sector are still to be achieved.

6.3. To effect change within the system, actions should lead to positive actions at all levels of the higher education system (European, national/regional, institutional and teaching staff and learners). This cascade of effects should reach the individual teacher and be converted into desirable and beneficial changes to their teaching practices in support of learners.

6.4. A current example of such desired change at the top-level is the Yerevan Communique (EHEA, 2015), which strives to achieve a student-centred higher education system. It is clear that to achieve this objective actors at every level (including students) must ensure that they behave appropriately and have the right attitudes towards the desired outcomes.

6.5. The challenge of changing the European higher education system will require significant investment and effort. These changes have to be effected while maintaining the current system's architecture and quality, as each individual current or prospective learner is dependent on the present system.

Three complementary areas of provision

6.6. Change and innovation have to take place in all areas of education. In all western higher education three complementary areas of provision are clearly discernible and growing:

- degree education, blended or fully online (in all three Bologna cycles—bachelor's and master's degree programmes and doctorates);
- continuous education and continuous professional development, blended or fully online, including short programmes and non-degree education; and
- online open education through OERs and MOOCs.

Blended and online modes of teaching and learning not only support, but also offer a ground for new activities in higher education as is the case with OERs and MOOCs, also in the area of continuous education.

6.7. Evidence of all these formats can be found on many university websites and in the university case studies gathered as part of this study. These three areas of higher education are interdependent and overlapping, as the same teaching staff and departments are often deployed to all three of them and the materials and techniques developed in one area can be transferred to the others. There is evidence that some universities view these three areas together as part of a digital education strategy.

Curriculum design and delivery

6.8. Although much progress has been made in introducing new pedagogies into European higher education and the use of technology is now widespread and essentially mainstreamed, much still remains to be done. The basic use of a VLE is almost ubiquitous. However, beyond that innovation using new online applications is uneven and the introduction of new pedagogies is even less apparent in most universities (see Section 3).

6.9. Having generally established a strong base of e-learning provision, universities need continuously to be encouraged to explore possible new pedagogies.

6.10. Building on the strong existing base of digital education, European and national metrics should be determined to record the extent of online, blended and open education to enable an overall view of the progress to be maintained (see Recommendation 4).

6.11. Where certification of university teaching practice exists through national bodies, such as Higher Education Academy (HEA) in England, the use of technology to deliver effective learning should be incorporated into this process. Where such recognition does not exist at a national level, it is recommended that it be established in some form (see Recommendation 3).

6.12. The development of expertise in the areas of teaching and learning should be promoted. Many national programmes exist for recognising excellence in research, but similar frameworks for such scholarship do not exist and should be established (see Recommendation 5). Monitoring HEIs in terms of the extent to which they recognise and reward excellence and innovation in teaching and learning in practice would do much to add impetus to this area.

6.13. All countries should have strategies for supporting innovation in pedagogies, increased use of technology and, in particular, in assessment, learning design tools and approaches to these areas, all in close alignment with funding frameworks and quality assurance in higher education (see Recommendation 1).

Accreditation, quality assurance and certification

6.14. Much progress has been made throughout the European Higher Education Area to put in place robust quality assurance processes for curricula leading to degrees. The coordination offered by ENQA has resulted in a high degree of harmonisation of approaches and learning from national experience, some with appreciable long-term sustainability.

6.15. From the evidence gathered we can conclude that higher education institutions, their staff and students, and the quality assurance agencies all have concerns about relevant and effective quality assurance for online and blended education. They are still at the beginning of a transition period, which has to be accelerated to exploit fully the opportunities offered by new modes of teaching and learning and to keep abreast of international developments in higher education. Clearly the MOOCs movement has stimulated awareness.

6.16. Quality Assurance agencies should develop frameworks that explicitly recognise new modes of teaching and learning (see Recommendation 8). These should encompass specific criteria and benchmarks which are complementary to existing frameworks. They should provide institutions with practical guidelines for their internal quality assurance for blended and online courses and programmes. Quality assurance and accreditation frameworks should be adapted to the specific contexts and needs in the areas of degree education and the rapidly evolving areas of continuous professional development (including non-degree and short-degree programmes) and open education (OER, MOOCs). The latter should be considered as spaces for innovation and experimentation.

6.17. QA agencies should be closely involved in national programmes and explorations of digital education and new pedagogies, as ENQA does at the European level as a partner in several projects to explore quality issues in higher education (e.g. E-xcellence Next, SEQUENT and EQTEL). This involvement needs to be true for all national agencies, and ENQA could take a leading role in supporting them. Such activity will support their in-house expertise and development of criteria for recognising and supporting new modes of learning and teaching (Recommendation 7).

6.18. With regard to MOOCs, It is important to bear in mind that technically, pedagogically and organisationally, they are changing rapidly. MOOC platforms are exploring different forms of MOOCs in an attempt to find more learners and hence more potential revenue. For example, Coursera has begun to offer its MOOCs as "always on" (i.e. not in a sessional format, but as courses that never close and to which learners can sign up and start whenever they wish). MOOCs that form a series (i.e. a mini-curriculum with a "capstone" MOOC) are also being tested. Some of these formats will make offering credits more attractive.

6.19. To enable European higher education institutions to participate in the worldwide expansion of online transnational education, national governments must review their legislative and regulatory frameworks and practices for quality assurance and accreditation to ensure that they do not prevent or impede the international provision by universities of online degrees and other ECTS credit-bearing courses (see Recommendation 6).

6.20. As a matter of urgency, at the European and national levels QA agencies should engage in an active dialogue with universities and their associations to agree best-practice approaches to quality assurance for innovation in learning and teaching. This dialogue should be aimed at producing public outputs that address not only the theme of technology and pedagogy in degree programmes, but also good practice in quality assurance in relation to flexible continuing education and open education. National QA agencies should ensure that they have in-house expertise in the areas of new pedagogies and the use of technology in higher education. They should also ensure that their QA panels contain an appropriate proportion of external reviewers with expertise in these areas.

Funding frameworks

6.21. In many European countries, funding has not been favourable during the recession and even now in many EU countries the levels of funding for higher education are falling. Very large disparities exist in funding between European countries. These disparities obstruct the further balanced development of the system, which underlies the European Higher Education Area. The higher education landscape in countries in which funding has fallen may alter considerably in comparison with other European countries. Beyond this, it should be noted that expenditure per student has started to decline even in the case of systems with increasing or stable levels of funding.

6.22. This is not only a national matter, but also an issue for Europe as a whole. In view of the discrepancies in funding between European higher education systems and to avoid backlogs, the Council of Ministers of Education should consider benchmarks for innovation through new modes of teaching and learning, possibly in synergy with the European Structural Funds. The innovation agenda should also be a full part of the Bologna process.

6.23. The objectives of the innovation agenda should focus on all three areas of higher education: (1) optimising the quality of the learning experience and the efficiency of degree education through blended education; (2) anchoring flexible continuing education in higher education systems, including continuous professional development, certified short programmes and university-business collaboration, all supported by online provision; (3) rooting a European offer of online open education through OERs and MOOCs in national higher education provision.

6.24. To support this, national governments may deploy one or more methods of funding frameworks, revealing different ways of stimulating and initiating innovation with different purposes. These include block funding, performance-based funding, competitive and non-competitive project funding, targeted or earmarked funding, and funding for excellence (see Recommendation 9).

Depending on the objectives of governments, these funding frameworks are all valid and fit for stimulating innovation. To initiate systemic change, performance-based funding based on strategic institutional agreements; the funding of frontrunners in excellence schemes and earmarked funding for a broad implementation of innovation in the majority of institutions are suitable, but not yet exploited sufficiently. Project funding is a perfect instrument for supporting leading projects by individual staff or groups of staff.

6.25. Funding should primarily strengthen enablers of innovation. The main enablers are promoting leadership for systemic institutional change, organising professional development of teachers, installing learning technology tools and services for course design, organising communities of good practice, sharing educational resources (e.g. OER) and making available relevant evaluation and research evidence for online and blended education (see Recommendation 9 and 10).

6.26. Cost assessment is an important aspect of institutional policy. Since universities have to operate at lower unit cost and with more students, funding imperatives become an important driver of change in higher education, requiring costing models for online teaching and learning and the scaling up of education provision. Governments should support universities to assess the costs and benefits of blended and online education and to share cost-benefit models.

6.27. Costing and the related business models differ significantly between blended education in bachelor's and master's degree programmes, online and flexible continuing education, and open education, including MOOCs (see Recommendation 11). Institutional development in higher education should therefore embrace a holistic approach, developing these areas in their own right, but also integrating them in practice, where possible. Their business models should be seen as complementary. Where continuing education and possibly in the future MOOCs generate revenues, universities should be able to use this income to cross-subsidise the institutional system as a whole.

General conclusion

6.28. New modes of teaching and learning are a major area of innovation, affecting all areas of European higher education provision. Having generally established a strong technological base for e-learning provision, universities now need to be continuously encouraged to explore possible new pedagogies. Especially, they need to focus on blended and online course design, e-assessment, learning communities, online tutoring, virtual labs and seminars, transnational online delivery, etc. Quality assurance agencies should support institutions by supporting the development of flexible criteria to stimulate and monitor progress. Governments should develop overall strategies for the acceleration of this innovation and organise diversified funding mechanisms to support frontrunner institutions as well as a broad implementation of new modes of teaching and learning in the majority of higher education institutions.

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