

Excellent education in research-rich universities

February 2017

The logo consists of the letters 'L', 'E', 'R', and 'U' arranged in a 2x2 grid. The 'L' and 'E' are in the top row, and the 'R' and 'U' are in the bottom row. The 'R' is colored orange, while the other letters are grey. The logo is set against a white square background with a subtle drop shadow.

LE
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PUSHING
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Executive summary

What are the particular features of student education in research-rich universities, and how is excellence in education conceived and practised? Drawing on data gathered via a qualitative questionnaire from the member universities of the League of European Research Universities (LERU) and a range of relevant academic literature, we examine the distinctive ways in which students are educated in research-rich institutions and the approaches being taken to develop educational opportunities to meet the needs of contemporary societies.

Relevant academic literature points to a number of key themes, including the nuanced relationships between research and student education within and beyond the curriculum, the complexities of defining research itself, the challenge of developing a quality culture and the importance of effective educational leadership. Data from the survey suggest that in research-rich universities students do not just learn about research; they also undertake research and enquiry within and across disciplines. Their active engagement with cutting-edge enquiry leads to a wide range of learning outcomes needed for professional life, including critical thinking, the ability to solve complex problems and ethical awareness. Examples of good practice from across LERU universities are presented, illustrating the ways in which students benefit by learning from researchers who are working at the cutting-edge of knowledge.

Barriers to the provision of excellent education are also explored. These include internal barriers, such as structures and processes, and organisational cultures that may traditionally have valued research more highly than student education. External barriers include limited funding in a time of massive growth in student numbers, lack of stability with funding and policy, and insufficient resources nationally and internationally for undertaking evidence-based studies into the effectiveness of higher education practices.

Within these challenging and changing contexts, research-intensive institutions are actively working to enhance their educational provision. Diverse approaches are being taken to enrich students' educational opportunities. These include re-framing curricula and student assessments to make them more research-rich and more directly relevant to local, national and global issues; developing academics as educators and as inspirational leaders in the domain of

student education; and rewarding those who invest their academic and professional expertise in student education and the student experience.

Conceptions of effective leadership are considered, and it is noted that those who take a lead on delivering high quality student education in general, and on developing excellent research-education synergies in particular, need to be recognised and rewarded for their vital contributions to the academic mission.

In conclusion, a number of principles which LERU universities support are characterised, including the need to:

1. Develop strategies that enhance the synergies between research and student education;
2. Work in partnership with students and other stakeholders, wherever possible, to implement research-rich curricula;
3. Regard excellent teaching and education-focused scholarship as activities on a par with excellent research;
4. Reward and promote excellent university teachers and education-focused leaders;
5. Inform teaching with the latest findings and practices of research and offer active research experience to all students from the undergraduate phase onwards;
6. Recognise that the skills, knowledge and attributes needed for research are vital for many citizens in the modern world, and articulate this clearly to students and employers;
7. Foster a culture of quality and enhancement, through dialogue and collaboration, with respect to student education and the student experience.
8. Empower students to become leaders and agents of change.

Finally a series of recommendations is presented that arise from the study. These relate to European, national and institutional policy and are designed to promote and enhance the excellence of education in research universities.

Recommendations

European policy

1. Better links between the European Research Area (ERA) and European Higher Education Area (EHEA) agendas should be built in the form of an integrated EERIA (a European Education, Research and Innovation Area), as mentioned in the LERU briefing paper *An Era of Change* (2014).
2. European Research Programmes such as Horizon 2020 should recognise the synergies between research and students' education by promoting the development of a strategy for a) transferring research results into teaching and b) enabling students to connect with and learn from research and researchers.
3. Teaching and professional development for teaching should become part of an academic career as early as possible, and promoted wherever appropriate, for example through research funding schemes at EU level.

National policy

1. National systems for funding universities should provide the greatest possible stability, in order to allow long-term planning.
2. National funding of the university sector must take into account the increase in student numbers, the growing demand for degree-level qualifications and the need to provide opportunities for lifelong learning.
3. Governmental evaluation systems should avoid reducing the quality of teaching and learning to simple metrics. They should recognise that the characteristics of teaching and learning in general, and research-based education in particular, can best be conveyed through qualitative case studies of impact on students and society.
4. In countries where career paths are nationally determined, a path should be opened for people who excel as scholarly teachers and who can take on an academic leadership role in the education domain.
5. National funding agencies should encourage all research proposals to build in a strategy for transferring research findings and innovative practices into effective educational opportunities for students.
6. National research funding schemes should promote teaching and professional development to become part of an academic career as early as possible.

Institutional policy

1. A university should develop an overarching education strategy together with policies that are congruent with that strategy.
2. Senior leaders should make the education strategy and policies clear to all those who teach and who contribute to student education, taking into account the different disciplinary and interdisciplinary cultures.
3. Universities should allocate an appropriate budget to education that takes into account the increase in student numbers, the growing need for the development of new educational technologies, and the need for professional staff to support this.
4. Universities should consider the diversity of their students, including their different levels of prior learning and preparation for undergraduate courses, and consider their different needs in the planning of teaching.
5. Universities should reward excellent teaching and create additional incentives for outstanding teaching and leadership of student education, providing high quality educational leadership programmes appropriate for different disciplines.
6. When hiring new personnel, an applicant's former teaching experience and success should be included and valued in the decisive criteria.
7. Universities should provide developmental opportunities for both early career and more experienced educators.

Introduction

1. At a time of change and challenge in the higher education sector, across Europe and beyond, what are the particular contributions made by research-intensive institutions in relation to student education? To what extent does a research-rich environment provide distinctive, high quality learning opportunities for students, preparing them for life and future employment in a volatile world? What are leading institutions doing to ensure that these opportunities are continually enhanced, and what barriers need to be overcome to ensure that educational provision is consistently of the highest quality? In order to consider these questions and provide recommendations for the sector, we synthesise findings here from a new survey of educational leaders of institutions within the League of European Research Universities.
2. Four related themes are covered:
 - i. Conceptions of the characteristics of excellent (or ideal) education in the context of research-intensive universities, illustrated by specific examples of excellent current practice;
 - ii. Perspectives on the internal and external barriers to the provision of excellent education, and the steps needed to overcome these;
 - iii. Current institutional approaches to enhancing student education;
 - iv. Conceptions of excellent educational leadership in a research-intensive context.
3. The survey (see Appendix 1) was circulated to Vice-Rectors of all LERU member institutions during 2016. Detailed responses were received from almost all institutions. The survey data were analysed first separately and then collaboratively by the three authors. All LERU institutions were then given the opportunity to comment on and add to the draft findings. This paper therefore represents the broadly shared perspectives of educational leaders from across the League of European Research Universities.
4. We begin with a brief literature review, and then present our findings from the survey data thematically. We conclude with a summary of recommendations for policy makers and institutions.

Literature Review

2.1 Scoping the literature: towards research-enriched education

5. Academic literature addressing the relationship between student education and research, sometimes referred to as the 'research-teaching nexus', has increased in quality and quantity in recent years. This relationship has typically been more evident in postgraduate programmes of study, but there is a growing interest in creating greater synergies between research and student education at undergraduate level. Elken and Wollscheid (2016) have recently published an extensive review of literature on linkages between research and education, referring to the range of typologies and indicators.
6. As Elken and Wollscheid (2016) show, the complexities of defining the key terms in this debate are considerable. **Research** itself is defined and practised in different ways. A traditional classification by Gibbons et al. (1994) distinguished between 'pure' (basic) research within a knowledge field (Mode 1), and research that is explicitly applied to 'real world' challenges, which is often multidisciplinary (Mode 2). This binary view may be an oversimplification, but it highlights some fundamentally different starting points for researchers, which need to be considered when we conceptualise research-education linkages.
7. As Becher and Trowler suggest (2001), there have been some significant shifts in the topography of academic knowledge, with developments in traditional disciplines and new ways of understanding knowledge production. The conceptions, practices and outputs of research can vary significantly between and even within subject disciplines (Becher and Trowler, 2001; Barnett, 2011; Brew, 2001; Levy and Petruilis, 2012). It is important therefore to see that being part of a research-rich culture benefits students by providing them with a range of approaches to knowledge and knowledge production. These relate to the learning that occurs when undertaking the specific academic, cultural and professional practices of particular disciplines and/or of thematic interdisciplinary investigations. Benefits for students also arise from the intellectual depth associated with engaging in any cutting-edge investigations, and from the range of skills associated with independent and collaborative enquiry.

8. Despite these variations, a broadly shared definition of research is that of 'advancing the frontiers of knowledge' (Nurse, 2015, p.11). Research in all academic disciplines - natural sciences, technologies, medicine, the social sciences, the arts and the humanities – produces knowledge that 'enhances our culture and civilisation and can be used for the public good' (Nurse, 2015, p.2). Research at the forefront of knowledge contributes to wider social communicative processes, foregrounding the need for society's advancement through critical enquiry and analysis. While practices differ, these underpinning principles of extending knowledge and making an impact for good on the world are broadly shared. They are reflected in a recent UNESCO publication that sees education itself as being 'for the global common good', embodying a 'shared responsibility for a sustainable future' (UNESCO, 2015, p.9).
9. The relationship between research and teaching may be more helpfully defined as a relationship between research and student education. The latter term encompasses not only the practices of those who teach in higher education institutions, but all elements which impact students' development through their time at university, including governance and leadership, institutional and departmental cultures, curriculum design and the provision of co-curricular opportunities (Elkin and Wollscheid, 2016). Together these systems and practices provide students with multiple opportunities to increase their knowledge, understanding and skills and to develop themselves as agents in the world: the work of educators and education leaders make vital contributions to the whole, but teaching itself is just one element (Fung and Gordon, 2016). The students' own active engagement with and commitment to the learning process are also vital factors impacting the quality of the education they experience.
10. Despite the complexity of defining terms, theoretical papers and empirical studies alike increasingly argue for the value of engaging students in a research-rich culture (Jenkins et al., 2007; Healey and Jenkins, 2009; Brew, 2006, 2012). Elken and Wollscheid (2016) distinguish between conceptualising a 'research-teaching' link, whereby teaching staff and their research are the focus of analysis, and a 'research-learning' link. The latter emphasises the engagement of students in active enquiry.
11. Healey's well-known typology (Healey 2005) refers similarly to the extent to which curriculum is 'research-tutored', 'research-led', 'research-oriented' and/or 'research-based'. This has provided a useful means of distinguishing between teaching students about research practices and findings through tutorials or in classes (research-tutored and research-led), explicitly teaching students about research methods (research-oriented), and engaging students actively in research and enquiry (the research-based approach).
12. While all of these areas are important, there is a growing focus in the literature on research-based models, reflected both in the classic Humboldtian model of the unity of teaching and research, and in the work of the Council on Undergraduate Research (CUR) in US. This emphasis in the US on providing opportunities for students to engage in research draws on work of the Boyer Commission on Educating Undergraduates in the Research University (1998).
13. Boyer (1990) pointed to the profoundly connected characteristics of education and research for academic faculty; both are seen as forms of scholarship. Scholarship can be seen as a holistic circle of activity, linking research, enquiry and learning to the common good (Fung 2016). Boyer's later work (1994) and that of the subsequent Boyer Commission (1998) highlights the importance of 'engagement'; researchers need to engage with the public, and students who undertake enquiry can communicate their findings to audiences beyond their class, and even beyond the institution. This notion of students' developing 'outputs' from their research is reflected in recent work on 'students as producers' (Neary et al., 2010), and in UCL's Connected Curriculum framework, which applies research-based principles to a whole-institutional strategy for curriculum development (UCL, 2016; Fung, in press).
14. The ways in which research and education connect with and strengthen one another are multiple and nuanced; they cannot be taken for granted. Gibbs has argued that universities need to take specific steps to ensure that students' learning experiences are enhanced by connecting with research. Simply studying in a research-intensive university will not bring benefits to students if the curriculum is not infused with the content and practices of research: 'The key point here is that such benefits have to be deliberately engineered – they do not accrue by magic simply because research is going on as well as teaching. The institutional indicator of quality in these studies is the existence of an undergraduate research opportunities scheme, not the strength of the institution's research' (Gibbs, 2010, p.29).

2.2 Issues of excellence, quality and leadership

15. The notion of **excellence** in relation to student education is a complex one, problematised in the academic literature. There have been numerous publications in recent years addressing the issue of how 'quality' in higher education might be defined and measured (see, for example, ENQA, 2014; QAA, 2015; Bendermacher et al., 2016).
16. The challenge of defining terms in such a way that shared understandings of excellence can emerge is addressed effectively by Elkin and Wollscheid (2016). They argue that there can be no single common measure because of the diversity of contexts and practices in different national settings, including: 'governance of the higher education system (who decides regarding particular issues); degree structure (what bachelor and master degrees across various fields of studies are expected to contain); level of standardisation (uniformity of requirements); and broader aspects related to academic culture in the country' (Elkin and Wollscheid, 2016, p.13).
17. Recent literature indicates a shift away from a focus on 'quality management', which can sit problematically alongside notions of academic freedom and the diversity of disciplinary cultures, and toward the need for a 'quality culture'. This is defined by the European University Association (EUA) as 'an organisational culture that intends to enhance quality permanently and is characterised by two distinct elements: on the one hand, a cultural/psychological element of shared values, beliefs, expectations and commitment towards quality and on the other hand, a structural/managerial element with defined processes that enhance quality and aim at coordinating individual efforts' (EUA, 2006, p.10). This implies, as Bendermacher et al. (2016) argue, that shared values and staff agency should be explored and promoted.
18. Developing excellent education in changing national and international contexts requires **leadership**. Recent literature on leadership in higher education highlights the particular complexity of leading in an academic culture, which values individual autonomy (Bolden et al. 2008, 2013; Bryman 2007, 2009; Floyd 2012, 2013; Flumerfelt and Banachowski 2011; Morley 2013, 2014).
19. Bendermacher et al. (2016) recently conducted a realist review to identify the elements of organisational contexts that either inhibit or promote a quality culture. They identified leadership and communication as the two most important elements. They argue that leaders are 'central 'drivers' of quality culture development through their ability to influence resource allocation, clarify roles and responsibilities, create partnerships and optimise people and process management'.
20. Studies suggest that the practices of effective leadership have been taken for granted in the sector, and academics may have had insufficient opportunity to develop those practices before taking up their roles or even while they are in post (Floyd, 2016). Education-focused leaders have also had less favourable conditions for reward and promotion in research-intensive universities, although that is beginning to change. Fung and Gordon (2016) show that leading research-intensive universities in the UK are increasingly rewarding education-focused leaders with promotions, including appointments to professorial chairs, on the basis of their impact on student education and contribution to research-education synergies. Practices remain uneven across the sector, however.
21. Strong arguments have been made for putting more resource into research in the field of leadership in the sector (Dopson et al., 2016), and particularly in relation to leadership that relates specifically to the domain of student education (Gunn and Fisk, 2013). Recent studies have highlighted the nuanced effects of academic 'microclimates' in relation to leadership of education (Roxå & Mårtensson, 2011) and the value of developing leadership roles which draw on and reflect the values and strengths of the whole academic community (Bendermacher et al., 2016). Haslam et al. (2011) note similarly that leadership itself is contingent upon social identity: 'the leader has no privileged position in providing answers, but serves instead to make collective conversations possible' (Haslam et al., 2011, p.217).
22. There is a particular need identified for leaders to 'make collective conversations possible' in relation to the education domain within research-intensive institutions. Gibbs et al. (2009) highlight the importance for leaders in research-intensive universities of focusing not on personal characteristics, but on activities and tactics. They emphasise the need for leaders to work in ways that are congruent with diverse academic cultures; this might involve leading emergent change, or more radical transformations of practice. Key areas for emphasis include establishing credibility with colleagues and involving students in decision-making (Gibbs et al., 2009, p.11).

2.3 Maximising research-education synergies: enriching research through student education

23. Some studies also highlight the potential of drawing students on taught programmes more readily into the research community *for* research. That is, there is an emerging argument that the benefits of connecting education with research flow in both directions. Becker and Kennedy (2005) note that while most research has addressed the benefit of a research-rich culture to students, there is also an argument to be made that researchers benefit from teaching. Surveying a wide range of economists, they identified thirteen categories of benefit, including honing one's understanding, developing new ideas through the process of teaching, keeping updated on the field through preparation for class, and developing new areas for investigation through discussion with students.
24. Tony Harland (2016), making explicit reference to the Humboldtian ideal of the unity of teaching and research, develops a conceptual argument for 'teaching-led research' in which 'university lecturers construct courses that directly and positively influence their research, while at the same time, safeguard and enhance the student experience'. As with many current scholars in the field, Harland promotes a research-based approach to curriculum, in which students are engaging actively in enquiry, and working alongside researchers, throughout their studies.
25. Scholarly literature increasingly makes the case for better inclusion of students themselves in the enhancement of their own educational provision. There has been a growing commitment across the sector to involving students in research which investigates aspects of teaching and learning, so that they can be active partners in developing, researching and implementing a vision for high quality student education (see Healey et al., 2014).

2.4 Literature review: conclusions

26. The notion of 'excellent education in research-rich universities' is multi-faceted and can be interrogated in different ways, using different conceptual lenses provided by a range of literature. Overall, academic studies suggest that students benefit from being in a research-rich environment if specific steps are taken to create a culture in which they become an active

part of a research and learning community. This may involve designing curricula and broader co-curricular experiences that allow them not only to learn about the latest research, but also to practise research and enquiry, both within and across established disciplines. It may also include enabling students, even on undergraduate programmes, to become contributors to and producers of research 'outputs' and to engage actively with local and wider communities.

27. The literature also suggests that institutions seeking to develop student education of the highest quality need to invest not only in education, but also in developing and rewarding educators and education-focused leaders. This entails creating a culture of engagement and partnership for academic and professional staff, and empowering students to become leaders and agents of change. Recent studies suggest that much is being done in these areas, but there is still work to do to maximise the benefits to students of studying in a research-rich environment.

Excellent Education: current perspectives from LERU universities

28. Education in LERU universities is enriched by their research-rich cultures. Our survey data show that teachers and students are increasingly accustomed to an active search for continuing enhancement and are willing to test and introduce innovative methods. In this way, fundamental principles of research are relevant for teaching itself. These principles have an impact on both students and teachers.
29. **Students** are seen as potential future researchers and partners, not just as objects in the teaching process. Not all students will become academic researchers, but all benefit from engaging in research, which develops a wide range of skills and attributes needed for the workplace and for life, including evidence-based thinking, problem-solving and ethical awareness. It must be emphasised that these are practical, applied, real world skills that can make a difference to everybody's lives and to society at large.
30. One can distinguish several steps in students' development. The first year of study is of particular importance; it should allow students to experience a range of subjects, explore their own interests and develop methodological skills. From the second year onwards, students need to understand how disciplinary knowledge is constructed and developed. By their final year of a Bachelor's degree - in some LERU universities even from the first year onwards - the students are taken to the forefront of their discipline to experience how they can create knowledge themselves and how to deal with complexity and uncertainty. Students need learning spaces where they face challenging tasks, find out about their discipline, develop a passion for the exploration of knowledge and communicate their findings effectively to diverse audiences.
31. A practical grounding is important, too, since only a small percentage of students will become university academics. The students' plans and values concerning their own futures as European and/or global citizens need to be considered seriously; they are a source of motivation. In this context, learning beyond the formal curriculum can be recognised in various ways, whether through additional certification or for formal credits. It is understood that many of the skills and attributes needed for the workplace can be developed through students' engagement with research and active enquiry while at university.
32. These principles demand a certain attitude from the **teachers**. The teaching staff address students' independent thinking, encourage their own research, and foster their analytical, critical, creative and social skills. Additionally, LERU universities aim to support students' personal development by promoting democratic and environmental awareness and active citizenship in their academic studies. The strong mutual commitment between students and teachers is based on constant feedback from both sides (evaluation of teaching; assessment of students' work).
33. Many teachers see themselves as constantly challenged to develop their teaching methods and the content of their courses. They know they are in a competitive environment and responsible for the success of their students. Many are open to new learning and teaching paradigms such as service learning, research-based learning and interdisciplinary teaching, and aim to provide their students with appropriate material, including digital content. Teachers are aware of the fact that there is diversity among their students, for example international students, students with children or students who learn at different speeds.
34. Many LERU universities are developing digital strategies that go far beyond the digitalisation of single lectures, but concern whole curricula. By doing this, institutions can provide digitally-mediated education that meets the needs of a diverse studentship for a rapidly changing workplace. Digitalisation in itself is not seen as a goal, but as a strengthening of a more systematic and effective use of information and communication technologies. It enhances education, and is appropriately accompanied

by face-to-face teaching, diverse learning resources and modes of assessment, and support by tutors. An online learning platform exists in all LERU universities; these are continually developed and improved. In addition, there is an increasing commitment, in response to the European Open Science agenda, to developing Open Education Resources. These give students open access to the latest research-informed publications.

35. In many universities, an academic career based solely on teaching has been impossible. LERU universities are on the way towards overcoming this attitude. Career paths for academics with a strong profile in education are being defined, and excellent teaching and educational leadership are being recognised to counterbalance research-dominated career paths. Awards for innovative and excellent teaching, sometimes made by the students, are a widespread incentive in LERU universities.
36. In order to strengthen the quality of teaching, some LERU universities have opened a Teaching Academy or Teaching Forum, whose members take a pioneering role in the area of teaching innovation. These engage excellent teachers and education-focused leaders, rewarding them and raising the profile of their work across and beyond their institutions.
37. Criteria for assessing teaching skills and the wider contributions made by educators and education-focused leaders are being discussed in faculties and across LERU universities. Higher Education Development Units and teaching policies based on educational research have been introduced. These are informed by a range of elements, including pedagogic research, teaching evaluations, polls among students and graduates, student focus groups and student representation on decision-making bodies. These policies and practices connect with broader quality assurance systems within institutions.
38. Educational leadership programmes also contribute to the continuous improvement of teaching quality. Continuing professional development of teaching staff is increasingly viewed as a matter of course. Excellent teaching practices are disseminated and published. Regular meetings of the Rector or Vice-Rector with the (vice-)deans for education are another sign of good governance of LERU universities.
39. Not only does research inform teaching, but teaching also influences research. Especially in courses where students are truly engaged, discussions between educators and students can have a direct influence on the research undertaken by the educator. Students very often bring fresh approaches and insights to the topic. This is very much the case in an interdisciplinary curriculum, where collaborations between students from different academic backgrounds often foster innovative thinking and practices.
40. Both groups, students and teachers, profit from the education-research nexus, which is a key characteristic of research-intensive universities. In some LERU universities, all teachers do research and all researchers teach; others have created some special teaching-focused roles, without the obligation of doing research. In the latter case, it is necessary to guarantee that teachers have permanent access to current research results in relevant disciplines, engage in scholarly inquiry in relation to teaching, and can enable students to undertake research.
41. When recruiting new staff, institutions increasingly value skills and achievements in relation to education and pedagogy alongside research outputs. These achievements may include pedagogical/didactic research into teaching in higher education.

At the University of Edinburgh, “Our changing world” is an interdisciplinary first-year course about global challenges, aiming at raising awareness how research and scholarship meet these challenges. Students are expected to address key global issues across disciplinary boundaries and develop an understanding of the relevance and impact of their own subject in the broader context.

<http://www.ed.ac.uk/biomedical-sciences/news/ocw-2015>

The University of Barcelona is also innovating. The Virtual Anatomy and Simulation Group works on the creation and application of teaching materials using high-quality advanced graphic systems. The Bioculture Group makes use of 2D and 3D imaging techniques as teaching tools. What is important here is not the use of technology in and of itself, but rather the incorporation of advanced research instruments and techniques in these fields into teaching contexts.

At the University of Cambridge, a number of departments offer research projects that enable students to collaborate with active researchers, rather than working on an individual project. One example of this is the Part II Project offered by the Department of Physiology, Development and Neuroscience. See: <http://www.pdn.cam.ac.uk/research/groups/human-anatomy-teaching-group/teaching-and-internships/PartIIrundown> The university also offers an Undergraduate Research Opportunities Programme (UROP).

http://to.eng.cam.ac.uk/teaching/urops/Notes_for_Staff.html

At the University of Freiburg, the dissection course in Radiology is eLearning-based. Students are trained to apply their knowledge in anatomy when interpreting imaging procedures such as x-ray, CAT scans and magnetic resonance tomography.

<http://www.lehrentwicklung.uni-freiburg.de/projekte/ida/ida-preistraeger-2013/ida2013>

At the University of Geneva, Masters students address human law in relation to vulnerable persons by engaging in concrete, real-world situations. This approach to teaching allows them to be directly in contact with all stakeholders, to link theory to practice, and foster collaboration between university and society. Students

put their competencies to use in the service of the greater good and engage in critical reflection on their discipline. They write a legal brief produced in the form of a free brochure, accessible to the concerned members of the public.

<http://www.unige.ch/droit/lawclinic.html>

At Lund University in the Faculty of Medicine, the physiotherapy programme has a longstanding reputation for excellent education, with a development-oriented leadership and outstanding outcomes in evaluations. The education is built on the principles of making use of current research, both in content and the education process. Opportunities for internationalisation have engaged both students and teachers.

http://www.med.lu.se/english/study/undergraduate_programmes/study_programmes_taught_in_swedish/physiotherapy

At the Université Paris-Sud, the School of Medicine uses cutting-edge simulation techniques. Comparable to flight simulators for pilots, simulation in medicine and health is an innovative mode of learning by doing. It allows the learner, through simulation exercises, to perform medical procedures in ways that simulate reality. The educational objectives of this training, which meets the needs of both students and professionals, are grouped into two categories: the learning and acquisition of skills and techniques, and the analysis and development of non-technical skills such as understanding, organisation and communication.

KU Leuven offers service-learning opportunities to its students. Serving, reflecting and learning are central to this teaching method: students serve a ‘real world’ community, mobilising their academic knowledge, skills and attitudes. They reflect in a structured way on their experiences. In this way students develop both their academic profile and their personal and social skills. These experiences equip them to become responsible and critical citizens.

<https://www.kuleuven.be/onderwijs/sl>

At Université Pierre et Marie Curie (UPMC), guided research workshops have been developed in order to

strengthen the nexus between research and training. In the first year of the undergraduate programme, these workshops are compulsory, focused on “peer project” teaching methods and encouraging autonomy. Each workshop concerns two fields for which the students work within small groups. They must master a scientific topic and work through research-thinking processes to produce results. This enables students to experience work in research labs.

<http://www.licence.premiereannee.upmc.fr/fr/enseignements/are.html>

UCPH in Copenhagen explores different ways of integrating research with teaching. A project has created a website to inspire students, teachers and researchers to focus on, and contribute to, research-based teaching as a way to improve students’ academic skills. The project has produced a dynamic inspiration catalogue in which researchers/teachers can share experiences about projects, course programmes or methodologies that can bring research into teaching, and vice versa. At UCPH students can choose to do a research internship. During a research internship students can be part of a team of researchers and learn how the subject is applied in practice and experience how research is conducted within their field.

<http://fbu.ku.dk/english/>

UCL (University College London) is responding to the European Open Science agenda by creating an innovative Open Educational Resources repository, run by UCL Library Services. Benefits of this approach include the ability more easily to share UCL research outputs across the UCL academic community, and to embed research-based resources into the educational curriculum. Additionally UCL Press, the UK’s first fully Open Access University Press, is developing an Open Textbooks offering. Its first textbook, *Textbook of Plastic and Reconstructive Surgery*, has received 3,847 downloads from all over the world in little more than 6 months. This is the model for universities for textbook production in the future, and UCL Press is promoting open access through a competition for UCL academics, offering a reward of £2,000 per author.

<https://www.ucl.ac.uk/ucl-press>

Perceived barriers to educational excellence

4.1 Internal barriers

42. Although many LERU universities are making strides forward in relation to valuing and developing research-rich education, some notable barriers to progress are evident. Our survey data suggest that insufficient funding for teaching is considered by LERU universities to be a general problem, both within institutions and at the national and international level (see 4.2). When financial resources are allocated, research units may be favoured. This is because universities build their international reputation on research, not on teaching. Politicians and society primarily expect internationally successful research, expressed in international rankings.
43. In the past, education was commonly seen to be less expensive than research, because its financing comprised mainly the salaries of teachers. But investments in state-of-the-art infrastructure - including technology-related support for teaching and learning and the continuing professional development of teaching and support staff - are expensive, so that teaching loses this comparative ‘advantage’. This can lead to an increasing tension between funding for research and for teaching. As a consequence, teaching and research are typically separated from each other – to the detriment of the education-research nexus.
44. One argument has been that enrolment of undergraduate students does not depend primarily on the quality of research but mainly on the reputation of teaching. For graduate students this might be different. However, with undergraduate students increasingly benefiting from participation in research, an argument can be made that both research and education need to be excellent, and that excellence can arise from ensuring that students benefit at all levels from being in a research-rich culture.
45. The universities’ financial situation leaves only limited room for providing lecturers with permanent posts, and good working conditions. Within some LERU universities, the number of teaching support staff is seen as insufficient. Innovative teaching initiatives demand strong technical support; this, too, is costly.

46. Even within LERU universities, one can observe quality-related differences in the organisation of teaching. In some of them, there are no teaching certificate programmes and no educational leadership programmes. The comprehensive use of learning platforms is not always customary. The Bologna reforms have not been implemented everywhere in a satisfactory way; students may be faced with too high a workload and too many exams. Some curricula have not yet been revised, and some may simply represent old wine in new skins.
47. The most important internal barrier to educational excellence is the attitude towards teaching vis-à-vis research. Teaching is often regarded as a personal matter, and for a long time quality oversight and systematic enhancement were not customary. Professors may not encourage early career staff to invest much time in innovative teaching, because an academic career (tenure and promotion) depends largely on research results and publications. Primacy for research over all other activities (leadership, teaching, administration) is deeply embedded. Since the competition for research money at the national and European level has become much harder, even less time remains for teaching and its preparation.
48. When hiring new staff, insufficient recognition may be given to the importance of teaching practices. Yet educational leadership and teaching lead to universities' having – through their graduates – a broad impact on societal development, whereas research more often influences specialised areas of knowledge. This distinction is undervalued.
49. There is not always a sufficient culture of cooperative work and practice (for example, peer assessment and mentoring) among teaching staff. The investment that teachers make in developing pedagogy and teaching methods can be low, due to the limited recognition of the importance of teaching quality. The building of requirements for academic and education development into selection and promotion criteria is beginning to happen in some institutions, however.
50. A strategic agenda for research-based education may be lacking. It may have been developed at the level of the Rectorate or Presidency, but not implemented throughout the whole of the university. The engagement with “middle leaders” (Heads of Departments) and the implementation in the departments is uneven, and in some departments it is insufficient. Agreeing on and establishing a clear strategy for the development of excellent teaching and research-based education is difficult, because the cultures of teaching throughout the university differ, as do the types of research undertaken. Flexibility is needed, but there also needs to be a shared dialogue around the practices and values that connect education with research.
- #### 4.2 External barriers
51. LERU member universities find that national funding of the university sector has been insufficient in recent years. Governments react to economic crises by tightening the financing of education on all levels: pre-school, school, higher education. In this list higher education is not in a strong position, because most voters have a school child in their vicinity, but not necessarily a university student.
52. Some disturbing developments have been noted in a number of European countries. With a general decrease in funds for the university sector, it is especially the domain of student education that suffers. Italy has announced a dramatic decrease in government funding, which is distributed mostly on the basis of research output. Finland, too, has experienced massive cuts to university funding with corresponding cuts in staffing. In other countries, public funding has decreased, but the tuition fees have not been raised.
53. There are only very few government-funded programmes focusing on financing the improvement of teaching, for example the German “Quality Pact for Teaching” (2011-2020: 2 billion euro). However, in this programme, funding for teaching is distributed on a competitive basis, so that faculty members constantly have to write applications and reports. As this funding is temporary, positive developments may not be fully sustainable.
54. In general, the university funding system seems to be less stable than it has been in the past. This creates uncertainty and can impair the ability of institutions to make long-term plans, threatening the integrity of teaching and research. Even if institutional autonomy has increased and the responsibility for the quality of education is given to the universities, they may have limited means and resources to enhance it. For research, the solution could be funding by the private sector, which is interested in the outcomes; this is not possible for teaching.
55. On the other hand, the massification of university education together with an open access policy in many European countries has led to an increase in student numbers, but not an equivalent increase in the numbers

of academic staff. It becomes more and more difficult to offer excellent teaching under these contradictory circumstances (less funding; more students).

56. Today, the quality evaluation schemes for research and teaching are independent from each other; this makes the integration of these practices more difficult. Additionally, national governments put emphasis on quantifiable indicators, but the quality of teaching, learning and educational provision more broadly are difficult to quantify; they are affected by multiple cultural factors. Therefore the governmental evaluation systems may not correspond well with the characteristics of teaching and learning, and give little opportunity to show how student education is being enhanced by the research-rich culture.
57. The national and international funding agencies for research do not typically regard student education as an important asset. Applications for research grants may or may not make any mention of how to transfer the results into the teaching domain; they are still judged as equivalent. The potential research outcome is an important criterion, but not the potential educational outcome.
58. Most national interpretations of the Bologna process include a quite rigid understanding of what Bachelor's and Masters programmes are: each has a defined duration, demands a certain quantity of credits and so on. This may not correspond to the reality of diverse students' lives. In order to achieve greater inclusivity, a less rigid understanding of the curriculum and more flexibility are needed.
59. In many countries, transition from school to university has become more difficult, since the school curriculum does not provide adequate preparation for undergraduate courses. This makes the need for a more flexible curriculum inescapable. Additionally, students' individual needs in the form of mentoring, tutorials, and coaching should be recognised. In countries where universities are not allowed to select the most able and motivated students, they welcome students who may not have the prior learning needed to succeed in high level education. These students need intense support.
60. One of the general aims of university policy is internationalisation. In the UK the visa policy is changing, so that internationalisation on both levels, scholars and students, is likely to become more difficult. This potentially influences the quality of student education, because the impact of international perspectives as an enrichment of students' learning diminishes.

The University of Amsterdam offers minor programmes (30 ECTS) in which a selected group of students work on a complex real-life challenge for a company or societal organisation. This allows them to utilise science and their academic background in a project at the interface of science, business and society. It gives students an interdisciplinary learning experience that will enable them to develop a flexible and professional attitude towards a dynamic future. The programme aims to enhance students' ability to steer system changes, utilise their academic knowledge, and develop adaptive and creative skills. The minor is for third year undergraduate and Masters students from all disciplines. See: <http://gss.uva.nl/future-msc-students/tesla-minor/tesla-minor.html> , <http://iis.uva.nl/en/interdisciplinary-education/future-now-minor/future-now-minor.html>

In order to be flexible and adaptable while facing complex multidisciplinary problems and the volatility of individual careers, University Pierre et Marie Curie (UPMC) offers programmes adapted to a diverse student body. All students can choose a Bachelor's degree in a single area of study, a major/minor programme with two fields, or a reinforced double major with two degrees. http://www.upmc.fr/fr/formations/reforme_licence.html

At LMU Munich, the Department of Arts stages a festival (Gärtnerplatz OpenAir) attracting several thousands of visitors each year. In cooperation with a large Munich theatre, students undertake a wide range of responsibilities, such as press relations, graphic design, dramaturgy and event management. This innovative measure not only enables students to combine theoretical and practical skills, but also furthers their employability. <http://www.kunstwissenschaften.uni-muenchen.de/lehre-at-lmu/praxisbuero/lehre/ss16/pflueger/index.html>

The University of Oxford has launched a "Race and the Curriculum Project" to explore ways of diversifying the curriculum to broaden student perspectives and to achieve greater racial and ethnic inclusivity. The project requires effective engagement with curriculum review at the level of academic departments. Work is currently focused on selected disciplines at undergraduate level in the humanities and social science.

www.ox.ac.uk/news-and-events/race-and-curriculum

University College London (UCL) is implementing an institution-wide initiative, 'Connected Curriculum', which aims to ensure that all UCL students are able to learn through participating in research and enquiry at all levels of their programme of study. Among other goals, the programme is about: educating through dialogue and active, critical enquiry; creating an inclusive research and learning community; making connections across modules, programmes and beyond the classroom; creating assessments that mirror 'public engagement' in research; equipping students to address interdisciplinary challenges; and exploring critically the values and practices of global citizenship. See Fung (in press) and: <http://www.ucl.ac.uk/teaching-learning/connected-curriculum>

At Heidelberg University, 30 projects from all faculties have been funded within the programme Welcome to Science (Willkommen in der Wissenschaft) since summer 2013. The aim of the programme is to promote research-oriented teaching from the first semester onwards across all disciplines. http://www.uni-heidelberg.de/forschung/nachwuchs/forschungsorientierte_lehre/willkommen_wissenschaft/

At the University of Amsterdam, the Institute for Interdisciplinary Studies is the knowledge centre for interdisciplinary learning and teaching. It has the explicit mission to develop innovative interdisciplinary education together with the UvA community. Besides interdisciplinary undergraduate and Masters programmes, it offers honours courses/electives and transdisciplinary minor programmes for all UvA students. It has developed new educational concepts such as the pressure cooker and the 'Create your own course Challenge'.

<http://iis.uva.nl/en/about-the-iis/about-the-iis.html>

LMU Munich has developed a programme to promote research projects carried out by students. The aim is to motivate interested students to undertake research, either through individual projects or as part of a student researcher group. Student research conferences organised by the Faculties of LMU Munich provide students with the opportunity to present their project to a large audience, and to exchange ideas with experienced researchers. Each year, the LMU Research Prize for Excellent Students is awarded to eight student research projects.

http://www.uni-muenchen.de/studium/lehre_at_lmuforschungsorientiert_lehre_neu/foerderung/index.html

Imperial College has established a highly successful 'Undergraduate Research Opportunities Programme' (UROP) aimed at students who wish to develop a deeper appreciation of research and the environment within which it takes place. The programme includes a framework of bursaries to support students' living costs. In 2015 more than 300 Imperial students took part.

<http://www.imperial.ac.uk/urop>

Trinity College Dublin is currently in the process of incorporating research-led and research-oriented teaching as part of an innovative programme of undergraduate curricular renewal. Central to the university's research mission are a series of multi-disciplinary Research Themes, ranging from Cancer to 'Making Ireland', each of which will develop research-led elective modules open to undergraduate students. At the same time, all final year undergraduates will undertake an ambitious research-oriented 'capstone' project, designed to bridge the gap between undergraduate study and postgraduate research.

Leiden University empowers students to 'Engage the Hague'. The Hague provides talented, highly motivated students with a first-class liberal arts & sciences education focused on addressing the global challenges of peace, justice, and sustainability. In the classroom, LUC students are trained to think critically about a range of pressing social issues, drawing on the interdisciplinary expertise of the oldest university in the Netherlands. In the community, through a variety of volunteer opportunities, research programmes and service-learning courses, they put their ideas into action by participating in practical, collaborative efforts to improve the lives of their neighbours in The Hague.

<http://engagethehague.nl/>

Enhancing the quality of education

61. Data from LERU member universities show that enhancing the quality of education – for example, in relation to curricula, teaching and learning practices and infrastructure – takes place continuously in policy and practice at research-intensive universities. Such on-going effort is needed in order to ensure that educational practices and learning outcomes reflect the dynamism of disciplinary and interdisciplinary knowledge. These practices and goals must also reflect changes in the social environment and external demand, developments in educational science, and the opportunities afforded by new teaching and learning technologies.
62. Research-intensive universities are diverse in their traditions, conditions, and contexts. Therefore they will also show diversity in the focus of their activities for the enhancement of educational quality, as a result of specific strategic choices and contexts. All research-intensive universities, however, strive to maintain and even strengthen the teaching-research nexus.
63. One way for universities to enhance the quality of education is through strategic curricular projects that are agreed at the institutional level and implemented across all disciplines and departments. Such projects are diverse in nature and may relate to issues such as quality standards for educational practices, a digital education strategy, the creation of multidisciplinary or interdisciplinary study programmes, diversity, undergraduate research and research-based teaching and learning and/or the introduction of a renewed educational philosophy.
64. Many research universities employ incentive programmes for teachers and researchers, individually and in groups, in order to implement strategic innovations in curricula and teaching and learning practices. These can generate bottom-up educational innovation, which may reach beyond strategic institutional priorities. In most cases these programmes are competitive and allow academic staff to obtain money, and thereby time and support, for educational innovation and transformation.
65. Most incentive programmes are targeted at specific types of innovation, such as e-learning, undergraduate research, or the creation of partnerships between study programmes and institutions or companies outside the university. Some incentive programmes are not targeted but rather aim at open innovation, experimentation, and the generation of new ideas – always in relation to the enhancement of educational quality. Incentive programmes for educational innovation may also aim at students directly, in the form of special scholarships or other opportunities.
66. Communication of information and the sharing of ideas and good practices are vital components of the educational enhancement strategy, both within departments and at the institutional level, and also in a national or international context. LERU policy and thematic groups are a good example of such international networks. Within the institutions we see teaching academies, pedagogical academies at faculty level, online journals and newsletters that highlight educational innovation and good practice, teacher forums, seminars and other events related to teaching and learning, and many more instruments for communication and networking.
67. All research-intensive universities have a well-established system of continuous professional development (CPD), increasingly linked to formal teaching qualifications that are required for tenure and promotion. CPD offerings are not limited to the basics of good teaching, but may also include educational leadership courses or advanced fellowship programmes. Many universities require teachers to develop a teaching portfolio, as a part of or linked to CPD activities. Such teaching portfolios allow university teachers to develop their educational philosophy, link theory to personal teaching practice, and reflect on progression as an academic.
68. Teacher awards highlight excellent practice in education. Universities may have institutional awards for teaching excellence as well as awards and prizes in departments or faculties. Students play an important role in the nomination of teachers for teaching excellence awards. Awards may relate to overall teaching quality or to specific aspects, such as innovation in e-learning. Teacher awards not only celebrate individual achievement, but also send a message about how the institution values good teaching.

69. Academic careers are largely defined by excellence in research, particularly in research-intensive universities. In order to balance research and education in recognition and career opportunities, universities have developed many new policies and practices. These include: specification of teaching quality criteria for promotion, incentive programmes for joining (national) teaching academies, or defining career paths for strong academics who invest heavily in teaching. In the process of recruitment and promotion of academic staff, universities increasingly take track record and portfolios for teaching into account.
70. The enhancement of high-quality education and excellence in teaching and learning require lasting, consistent and sustained leadership in research-intensive universities, in order to keep all the elements discussed in this section high on the policy agenda. University leadership should strongly promote the integration and relatedness of teaching and research as an essential characteristic of the university. Strong leadership is particularly required in the current context of external pressures and threats to separate education and research in national policies, of eroding funding for higher education, and of strong bureaucratic pressure due to regulation and accountability requirements.

In the University of Milan, the Ulisse project aims to connect students with industry as well as with research. The project is being pioneered in the Computer Science Bachelor's degree course. Students achieve 60% of their second year credits (ECTs) through work-based projects designed in collaboration between teachers and firms. In their final year they work with the firms under the joint guidance of teachers and firms, getting a small salary for this apprenticeship.

http://www.cosp.unimi.it/matricole_iscritti/4992.htm

The University of Zurich (UZH), for over a decade, has been enhancing innovative forms of interactive (e)learning through its Interactive Learning Initiative (IIL – Initiative Interaktives Lernen). So far more than one hundred projects have been funded across all departments of the university. The university also has opened the option for academic staff to apply for “Teaching Credit” (Lehrkredit), either for the development of MOOCs and other online formats, or for projects that strengthen the teaching-research nexus. For the Teaching Credit initiative,

<http://www.lehrkredit.uzh.ch/en.html>

The University of Cambridge has recently established a teaching forum to bring together academics who teach to learn about innovative approaches being used by others in Cambridge, to meet and share interests and ideas, and to discuss current teaching and learning issues. The initiative is under an umbrella virtual Centre called Cambridge Centre for Teaching and Learning.

www.teachingsupport.cam.ac.uk/

The University of Copenhagen (UCPH) has decided that all of its teachers must prepare and maintain a teaching portfolio to strengthen the quality of teaching and to promote a more equal balance between teaching and research. The teaching portfolio is a tool for continuous reflection on and development of teaching. UCPH also introduces a pedagogical competence profile, which will be used in conjunction with the teaching portfolio. The profile describes a number of areas important for mapping a university teacher's overall teaching competencies. It also provides a common language at UCPH for describing teaching qualifications and is compatible with international standards. From 2018, the portfolio will be included in the annual performance and development reviews (PDR) for teachers along with

UCPH's pedagogic competence profile. The deans are responsible for implementation in the faculties.

http://uddannelseskvalitet.ku.dk/quality-assurance-of-study-programmes/development-initiatives/teaching-competencies/pedagogical-competence-profile/download-the-competence-profile/KUs_p_dagogiske_kompetenceprofil_UK.pdf

Heidelberg University's Centre for Teaching and Learning offers scholars on all levels (student tutors, PhD students and full-time teachers) a variety of courses and certificates in and about university didactics. <http://www.uni-heidelberg.de/slk/>. This is part of the network of the universities in the federal state of Baden-Württemberg that offers an educational staff development programme www.hdz-bawue.de that is issued by the Ministry of Science, Research and the Arts.

The University of Helsinki Teachers' Academy is a network of distinguished university teachers which aims to improve the general standing of teaching, for example by according scholarships of teaching.

<https://www.helsinki.fi/en/university/teachers-academy>

Utrecht University's EducateIT programme combines professional development for academic staff in all aspects related to e-learning with on-the-job support in innovation projects and provision with the required infrastructure. The programme combines the institution's strategic ambition for e-learning with bottom-up initiative. <https://educate-it-uu.sites.uu.nl/en/>

KU Leuven has tackled the possible lack of recognition of the importance of teaching quality, and of cooperative work and practice among teaching staff, by introducing a new method for quality enhancement in 2015 (see: <http://www.kuleuven.be/quality-assurance-portal/>). Essential characteristics of this method are the appreciative approach of teaching quality and the importance attached to dialogue among the academics and the students. The method embodies high trust in the disciplinary communities and their specific ways of dealing with teaching quality. Faculty and university authorities act as facilitators to create the conditions for the kinds of quality teaching valued by the disciplinary communities.

LMU Munich has been running a 'multiplier project' since 2012. Under the slogan 'getting excited about teaching, teaching competently', academic staff members from all faculties have taken part in this project. Senior and junior academics work in tandem to further improve their education in the area of teaching and leadership skills. The project aims to raise the status of teaching and to establish a culture characterised by excellence in teaching and innovation, as well as by appreciation of each individual.

<http://www.multiplikatoren-projekt.peoplemanagement.uni-muenchen.de/index.html>

Utrecht University has recently started a new Teaching Fellow Programme. The aim of the programme is to strengthen educational leadership and to increase the number of professors with a special focus on education. It is a highly selective program in which Teaching Fellows work two days a week on a project aiming at teaching innovation. After 3 to 5 years, successful completion of the programme will lead to a nomination for a position as full professor with a special emphasis on education. The programme is funded by the Executive Board of the University and is open to candidates from within and outside of the University. The current programme builds on a Teaching Fellow Program started already in 2011. For an overview of 2011-2015 achievements see: <http://www.uu.nl/en/education/top-lecturers-and-top-students/teaching-fellows>. For information on the current programme, see: <http://www.uu.nl/en/news/a-new-teaching-fellow-programme>

The University of Zurich's new qualification programme, Certificate of Advanced Studies in Hochschuldidaktik (12 ECTS), focuses on the research-teaching nexus. After an introduction to Research-Based Teaching and Learning (RBTL) as well as to the Scholarship of Teaching and Learning, participants develop their own projects. They either choose to adapt regular courses to the RBTL framework or run action research on their own teaching. The programme aims to have substantial impact on teaching in the departments and to stimulate an on-going dialogue on teaching and research.

<http://www.weiterbildung.uzh.ch/de/hochschuldidaktik/cas.html>

Educational leadership in research-intensive universities

71. Given the complexity of the higher education mission, it is unsurprising that effective leadership in the education domain is seen to be vital if the sector is to flourish in the twenty-first century. LERU institutions highlight a number of different aspects of excellent leadership, emphasising the importance of investing in leaders who are credible and authentic, and who can make a real impact on the quality of student education. As one university contributor commented, 'Leadership shows not only in vision, but also in the capacity to implement change in practice'.
72. Excellent leaders are seen as those who can balance research needs with educational needs. They must have the capacity to understand and value the typical mix of qualities and objectives (in knowledge and research, education, human capital, external engagement and potential for public service) in a research-intensive university, and to use these qualities to the maximum for excellent education. They must understand and work with diverse academic 'microclimates' (see Roxå and Mårtensson, 2011).
73. Showing a good awareness of contexts, for example the changing labour market, leaders should be able to ensure that programmes of study are updated in the light of contextual changes - including new developments in research. They need to be able to transfer innovations from research and from professional practice effectively into the curriculum.
74. Leaders need to be able to motivate and involve others, through dialogue, in the improvement and development of teaching and learning practices, including curriculum development. They should demonstrate consistent and authentic leadership practices at all levels within the institution, including the most senior.
75. With a developed understanding of the value of education to students, leaders should have a clear overview of educational objectives, going beyond customary practices to use student-centred approaches, with a focus on the students' exit profiles.
76. Leaders should gather and act effectively upon feedback from students and other stakeholders. Setting clear targets, reviewing data and using it to plan for improvements, they should become agents for change in bringing about necessary and successful developments within the subject discipline, across subject boundaries or even across the whole institution. In their roles, they should empower students so that they have a voice as full participants in their learning and research community.
77. Key insights afforded by educational research should be applied to practice. At the same time, the latest research in the relevant discipline(s) should be embedded into students' learning opportunities, and curricula should be managed so that they are responsive to the research interests of academics.
78. Leaders should recognise and encourage engagement in teaching by individual research-active academics and value teaching-focused scholars. They should also value and encourage professional staff in the vital roles they play in creating an excellent educational environment for students. Leaders at all levels of the institution should ensure that excellent teachers, education leaders and professional staff are rewarded well for their contribution, and have appropriate opportunities for development and creative collaborations with their peers.
79. LERU members suggest that leaders should be seen as role models to others. They should:
- be excellent teachers who can motivate and enthuse learners
 - enact the unity of research and teaching by developing new opportunities for students to engage in research and active enquiry
 - undertake education-related developmental programmes, even as an experienced leader, to set an example for others
 - promote the quality of teaching both within and beyond their own subject field
80. Several LERU members cited positively work by Gibbs et al. (2009) on educational leadership in research-intensive

institutions, which highlights the following attributes:

- establishing credibility and trust
- identifying teaching problems and turning them into opportunities
- articulating a convincing rationale for change
- devolving leadership
- building communities of practice
- recognising and rewarding excellent teaching and teaching development
- marketing the department as a teaching success
- supporting change and innovation, and
- involving students.

81. Another study cited was by Quinlan (2014), which argues that excellent educational leadership involves:

- a) Shaping organisational conditions (including culture, curriculum, co-curriculum and the community) to support a rigorous and demanding student experience;
- b) Recognising the power of personal example – so understanding the importance of the personal characteristics and integrity of the leader as a person, including demonstrating a sense of purpose, authenticity in his/her style, trustworthiness, credibility and intentionality; and
- c) Playing an active role in teaching and learning enhancement, such as promoting and directly participating in formal and informal teacher learning and development alongside teachers, establishing goals and expectations and direct involvement in planning, coordinating and evaluating teaching and the curriculum through such actions as coordinating across classes and years, regular classroom visits and giving feedback to teachers. The key feature of this aspect of the framework is that leaders are knowledgeable about learning and teaching, and about evidence-based approaches, and focus on teaching and learning enhancement as their core business.

82. Finally, leadership in relation to student education is a demanding, scholarly role that should be recognised and rewarded. Leaders need to be developed appropriately and empowered to build on education-research synergies, for the benefits of students and the wider community. They should be equipped to ensure that diverse students are fully included in the university community, and that students' voices are heard.

In London, UCL has developed UCL Arena, a scheme offering four categories of nationally accredited awards (Fellowships) for those who teach and/or take educational leadership and strategic roles. Offering developmental activities for all, UCL Arena facilitates a suite of engaging events, including very popular 'exchange seminars' through which colleagues share good practice and innovations. A key focus of the scheme is on building the synergies between research and student education by developing a research-based Connected Curriculum, and the Fellowships awarded feed into criteria for promotion. <https://www.ucl.ac.uk/teaching-learning/arena>

In Germany, the Ars legendi Prize of the Stifterverband für die Deutsche Wissenschaft is awarded annually to exceptional scholars in all disciplines for their outstanding contribution to teaching. Furthermore, fellowships for innovation in university teaching are offered to further advance this field of education.

The Leiden University Student Platform is responsible for organising and awarding the Leiden Teaching Prize. Every year Leiden University awards a prize to the lecturer who stands out as an excellent teacher. The award is presented at the Dies Natalis. Apart from the honour of being chosen for the Teaching Prize, the winning lecturer will receive a sum of 5,000 euros to be spent on teaching. He or she will also be made a member of in the Leiden Teachers Academy.

<http://students.leiden.edu/news/whos-the-best-teacher.html>

In 2013, the University of Edinburgh published a set of concrete and evidence-based exemplars of excellence in student education. These exemplars are designed to provide guidance to colleagues applying for promotion on how they can evidence their individual achievement in teaching and learning. They are also intended to support those colleagues involved in evaluating promotions and rewarding excellence.

See the following blog: www.teaching-matters-blog.ed.ac.uk/?p=94

In France, teacher-researchers can benefit from an excellence award recognising their actions in research. In order to balance out recognition between research and teaching, Université Pierre et Marie Curie has implemented a comparable award for contribution to student education. The aim of this award is to recognise contributions in areas such as educational leadership, innovation, and student support.

Summary of agreed principles

83. To summarise, LERU member universities recognise the need to:
 1. Develop strategies that enhance the synergies between research and student education;
 2. Work in partnership with students and other stakeholders, wherever possible, to implement research-rich curricula;
 3. Regard excellent teaching and education-focused scholarship as activities on a par with excellent research;
 4. Reward and promote excellent university teachers and education-focused leaders;
 5. Inform teaching with the latest findings and practices of research and offer active research experience to all students from the undergraduate phase onwards;
 6. Recognise that the skills, knowledge and attributes needed for research are vital for many citizens in the modern world, and articulate this clearly to students and employers;
 7. Foster a culture of quality and enhancement, through dialogue and collaboration, with respect to student education and the student experience.
 8. Empower students to become leaders and agents of change.

Recommendations

Having discussed the findings of this study, LERU makes the following recommendations with a view to enhancing further the excellence of student education in research-intensive universities.

a) European policy

1. Better links between the European Research Area (ERA) and European Higher Education Area (EHEA) agendas should be built in the form of an integrated EERIA (a European Education, Research and Innovation Area), as mentioned in the LERU briefing paper *An Era of Change* (2014).
2. European Research Programmes such as Horizon 2020 should recognise the synergies between research and student education by promoting the development of a strategy for a) transferring research results into teaching and b) enabling students to connect with and learn from research and researchers.
3. Teaching and professional development for teaching should become part of an academic career as early as possible, and promoted wherever appropriate, for example through research funding schemes at EU level.

b) National policy

1. National systems of funding universities should offer the greatest possible stability, in order to allow long-term planning.
2. National funding of the university sector must take into account the increase in student numbers, the growing demand for degree-level qualifications and the need to provide opportunities for lifelong learning.
3. Governmental evaluation systems should avoid reducing the quality of teaching and learning to simple metrics. They should recognise that the characteristics of teaching and learning in general, and research-based education in particular, can best be conveyed through qualitative case studies of impact on students and society.
4. In countries where career paths are nationally determined, a career path should be opened for people who excel as scholarly teachers and who can take on an academic leadership role in the education domain.
5. National funding agencies should encourage all research

proposals to build in a strategy for transferring research findings and innovative practices into effective educational opportunities for students.

6. National research funding schemes should promote teaching and professional development to become part of an academic career as early as possible.

c) Institutional policy

1. A university should develop an overarching education strategy together with policies that are congruent with that strategy.
2. Senior leaders should make the education strategy and policies clear to all those who teach and who contribute to student education, taking into account the different disciplinary and interdisciplinary cultures.
3. Universities should allocate an appropriate budget to education that takes into account the increase in student numbers, the growing need for the development of new educational technologies, and the need for professional staff to support this.
4. Universities should consider the diversity of their students, including their different levels of prior learning and preparation for undergraduate courses, and consider their different needs in the planning of teaching.
5. Universities should reward excellent teaching and create additional incentives for outstanding teaching and leadership of student education, providing high quality educational leadership programs appropriate for different disciplines.
6. When hiring new personnel, an applicant's former teaching experience and success should be included and valued in the decisive criteria.
7. Universities should provide developmental opportunities for both early career and more experienced educators.

Appendix 1: Questionnaire circulated to LERU universities in 2016

Excellent education in research-rich universities

- 1 Please provide brief descriptions of **two or three examples of excellent education** (or learning and teaching) in your institution. These may include, for example, very good practice within a discipline, in interdisciplinary provision or through a broader institutional activity (e.g. a global citizenship programme). Please provide online links to further information if available.
- 2 Please give examples of and/or links to **ways in which you are currently enhancing education** in your institution, including ways in which you are building on the education-research nexus.
- 3 What do you see as the most significant **external barriers** to ensuring that students experience excellent education in your university? (For example: funding policies; access policies; tensions between the research and education missions; national context; regional context...)
- 4 What do you see as the most significant **internal barriers** to ensuring that students experience excellent education in your university? (For example: institutional working cultures; academic/educational leadership and reward structures; internal funding structures; local policies...)
- 5 What do you see as the **most important changes needed** to overcome these barriers? (These may be, for example, international, national, institutional, cultural and/or conceptual.)
- 6 Please define in no more than 200 words the **characteristics of excellent (or ideal) education** in the context of research-intensive universities.
- 7 Please define in no more than 200 words the **characteristics of excellent educational leadership** in the context of research-rich universities.

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