Interdisciplinarity and the 21st century research-intensive university

Fostering, investing in and managing interdisciplinarity – with 66 recommendations

Katrien Maes, LERU chief policy officer

“Interdisciplinary Futures” INTREPID conference
Lisbon, 19-20 January 2017
23 European research-intensive universities committed to the values of high quality teaching within an environment of internationally competitive research

LERU members:
University of Amsterdam
Universitat de Barcelona
University of Cambridge
University of Edinburgh
University of Freiburg
Université de Genève
Universität Heidelberg
University of Helsinki
Universiteit Leiden
KU Leuven
Imperial College London
University College London
Lund University
University of Milan
Ludwig-Maximilians-Universität München
University of Oxford
Pierre & Marie Curie University
Université Paris-Sud
University of Strasbourg
Utrecht University
University of Zurich

Influence policy in Europe
Develop best practice
Relevance for all RIUs

University of Copenhagen
Trinity College Dublin

Founded in 2002
Mission and activities

- **Encourage education** through an awareness of the frontiers of human understanding
- **Foster the creation of new knowledge through basic research** as the ultimate source of innovation in society
- **Promote research across a broad front**, which creates a unique capacity to respond to new opportunities and problems.

- Policy development and advocacy
- Publication of papers, reports, notes, …
- Events and meetings in Brussels
- Exchange of experience and good practice
- Institutional reflection
- Communities, working groups, expert groups, …
LERU publications

- Natural sciences in H2020: Note published August 2016
- Interim evaluation of H2020: AP published 20/10/2016, launch event 21/10/2016
- Interdisciplinarity: PP published in November 2016, launch event 14/12/206
- Excellent education at RIUs: PP to be published and launch event 2/2/2017
- FP9: paper to be published in first quarter of 2017
- Research impact: paper to be published in first quarter of 2017
LERU press releases

Do you want to receive all LERU press releases and communication? Please send an e-mail to: Bart Valkenaers, Press and Communications Officer.

- European Parliament says NO to proposed EU budget cuts and YES to research & innovation
  (26 October 2016)
- LERU’s interim evaluation of H2020
  (20 October 2016)
- Citizen science at universities: Trends, guidelines and recommendations
  (12 October 2016)
- LERU and Central-European universities team up for better research and education policies
  (8 October 2016)
- What kind of world is STM living in?
  (19 September 2016)
- EU copyright reform and TDM: potentially good for research but certainly not (yet) for innovation!
  (14 September 2016)
- Alain Bertetz appointed as Director-General for Research and Innovation in France
  (14 September 2016)
- H2020 should focus on innovative collaborative discovery research, not on technology readiness
  (29 August 2016)
- Academic co-operation with the UK remains essential for Europe
  (14 July 2016)
- “2.5 pages of nonsense” - The statement on the Open Science Council conclusions
  (2 June 2016)

In the media

LERU gets into the media by a number of articles or interviews appearing in magazines, newspapers, on websites, ...

- La Lern s’associe à un groupe d’universités de recherche d’Europe centrale et orientale
  (AEF, 12 October 2016)
- EU universities must not ‘punish’ UK for Brexit vote
  (Times Higher Education, 14 July 2016)
- UK government sets up Horizon 2020 discrimination hotline
  (Science Business, 14 July 2016)
- EPSI extension plan raises budget fears
  (Research Europe, 16 June 2016)
- Data-mining dispute heats up over exception
  (Research Europe, 16 June 2016)
- Open Science panel picked
  (Research Europe, 2 June 2016)
- JPI chairs seek to rally member state support
  (Research Europe, 19 May 2016)
- Audit reveals ‘Europe’s MIT’ mired in problems
  (Chemistry World, 10 May 2016)
- Doubts linger over impact of new data protection rules on research
  (Science Business, 21 April 2016)
- Multibillion-euro innovation hub slammed by auditors
  (Nature, 14 April 2016)
- Brexit: The collapse of a world-class research system for the UK?
  (International Innovation Magazine, 31 March 2016)
- LERU sets out best practice in QA for doctoral training
  (University World News, 11 March 2016)
- Academics across Europe join ‘Brexit’ debate
  (Nature, 3 February 2016)
- Dutch lead European push to flip journals to open access
  (Nature, 6 January 2016)
LERU and interdisciplinarity

- How do LERU universities see ID? (vision)
- There are challenges, how do universities turn them into opportunities? (investing)
- What do they do: strategies, initiatives? (implementing)
- What have we learned? What are our recommendations?
A specific form of collaboration as well as a broad umbrella for designating collaboration between disciplines.
LERU vision of interdisciplinarity

- Vision: disciplinarity and interdisciplinarity are equally important
- Virtuous circle between them
- Bottom-up ID – academically oriented basic research
- Top-down ID – problem-focused applied research
### Bottom-up vs Top-down Interdisciplinarity

<table>
<thead>
<tr>
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<th>Bottom-up Interdisciplinarity</th>
<th>Top-down Interdisciplinarity</th>
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<tbody>
<tr>
<td><strong>Type of research</strong></td>
<td>Academically oriented basic research</td>
<td>Problem-focused applied research</td>
</tr>
<tr>
<td><strong>Nature of the challenge</strong></td>
<td>Very long process resulting from the needs of the disciplines</td>
<td>Respond to societal challenges, generally driven by governments or society</td>
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<td><strong>Structure</strong></td>
<td>People belong to a disciplinarity community but participate in projects for limited amount of time before returning to their disciplines or also while working within their discipline.</td>
<td>Informal networks or interdisciplinary structures that respond to long-term challenges such as migration, health, sustainability, the environment</td>
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<td><strong>Evaluation</strong></td>
<td>Currently difficult because of a lack of competencies and criteria to evaluate research</td>
<td>Problematic when it is only based on scientific indicators without taking into account societal impact</td>
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<td><strong>Outcomes at the macro-level</strong></td>
<td>The produced content is appropriated by the disciplines. Highly successful interdisciplinary collaboration can result in the creation of a new discipline.</td>
<td>Successful interdisciplines have strong links with other actors and influence governance (for example, the IPCC in environmental sciences).</td>
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<td><strong>Examples</strong></td>
<td>Biochemistry, digital humanities, nanosciences, neurosciences, ...</td>
<td>Environmental and sustainability sciences, global governance, global health, ...</td>
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3 targets – 66 recommendations

First target: University governance of interdisciplinarity

Second target: Evaluating and funding ID research

Third target: Publication and valorisation of ID research
First target: University governance of interdisciplinarity

1A/ Establish ID as a core business of the university
1B/ Identify and support priority areas
1C/ Prepare the terrain for ID in education
1D/ Create the next generation of interdisciplinary researchers
1E/ Promote a culture of ID and continually improve the system
Second target: Evaluating and funding ID research

2A/ Improve funding for ID research
2B/ Consolidate evaluation of ID research: ex ante
2C/ Consolidate evaluation of ID research: ex post
2D/ Select the panel carefully

Third target: Publication and valorisation of ID research
First target: University governance of interdisciplinarity

1A/ Establish ID as a core business of the university

1) Incorporate ID in their governing structures – e.g. setting up a reflection group or task force within the Rector’s office, supporting ID research at the institutional research policy level;

2) Entrust the Vice-Rectors for Research and/or Education with the responsibility to move ID forward. Maybe create a Vice-Rectors position for interdisciplinary research is one option.

3) Fill the main positions with a senior and/or leading academics with strong experience in ID research and an awareness of the institutional obstacles associated with interdisciplinary practice;

4) Set up an advisory committee composed of successful ID researchers, for example, to identify local institutional barriers, etc.;
1B/ Identify and support priority areas

5) Identify priority areas for the development of interdisciplinary research and education;
6) Secure an institutional budgetary line to support interdisciplinary research and education;
7) Encourage and facilitate interdisciplinary interactions based on existing institutional strengths;
8) Build a flexible organisational environment;
9) Ensure that adequate management and administrative staff are provided to key areas;
10) Develop partnerships and programmes in priority areas with other actors;
1C/ Prepare the terrain for ID in education

At the BA and MA level

11) Introduce basic concepts in critical thinking;
12) Develop seminars with a problem-based approach;
13) Make sure that students understand the general process of science but also the diversity of practice across the sciences;
14) Develop further concepts in history and philosophy of science such as scientific objectivity, etc.;
15) Introduce the ID research process through the use of textbooks dedicated to the issue and assess students on their capacity to look at problems through the prism of several disciplines;
16) Train students to question, look for, and recognise the disciplinary provenance/origin of knowledge;
17) Make students experience work in ID teams and provide research opportunities for the final dissertation;
1C/ Prepare the terrain for ID in education

At the doctoral level

18) Provide opportunities for doctoral researchers who share a common topic to exchange with doctoral researchers from other disciplines;

19) Set up clear expectations and quality criteria for ID doctoral theses: in practice an agreement on the required level of methodological sophistication/domination is easier to reach on a case-by-case basis depending on the disciplines involved;

20) Foster team supervision for optimally advising an ID doctoral research project;

21) Develop doctoral training modules focused on the practice and methods of ID research. This can be based on seminars about the challenges of ID research and group workshops that encourage doctoral researchers to question their own ontological and epistemological assumptions;
1C/ Prepare the terrain for ID in education

On the instructional side

22) Establish a committee for ID education to elaborate an institutional strategy;
23) Enhance the status of ID teaching to reward investments in building interdisciplinary courses or curricula;
24) Develop support from pedagogical units to overcome problems in ID teaching.
1D/ Create the next generation of ID researchers

25) Recognise that the selection of ID researchers differs from disciplinary researchers and adapt promotion practice;

26) Create hiring opportunities that favour researchers with ID skills and value profiles that combine several disciplinary backgrounds;

27) Identify and support early career ID researchers that have potential for developing leadership, for example through fellowship, advice, and mentoring;

28) Encourage joint tenure commissions across two or more schools or departments with a representation of members from different disciplines;

29) Establish clear terms of references to reduce the risk associated with double administrative and teaching load;

30) Provide support and training opportunities to researchers, for example through the academic research division, for attracting external funding, since obtaining funds is key for the development of interdisciplinary research.
1E/ Promote a culture of ID and continually improve the system

31) Showcase successful ID projects (cf. LERU, 2014 - SSH);
32) Include ID in the strategy of the university, explicitly recognise its importance and position the university as a place where ID research is valued and proactively encouraged;
33) Make the university engaged in societal issues by organising debate and events on relevant topics with the participation of scholars from different disciplines and others relevant actors;
34) Recognise and value the contribution of schools and departments to ID structures for educational and research activities;
35) Organise summer schools on ID or online opportunities;
36) Evaluate the implementation and performance of ID projects and structures such as centres through review mechanisms on a recurrent time basis;
37) Monitor ID in scientific publications;
38) Explore how ICT can facilitate ID collaboration, for example regarding indexing the competencies of researchers across the university.
Second target: Evaluating and funding ID research

2A/ Improve funding for ID research

39) Create specific ID research opportunities with earmarked funds;
40) Adopt and communicate clear strategies regarding ID research;
41) Design innovative mechanisms to promote high-impact and/or high-risk ID research;
42) Develop funding opportunities requiring collaborations with organisations outside the academic sector, such as governments and ID research projects;
44) Establish and disseminate guidance and explicit criteria for evaluation and excellence in ID research;
45) Allocate enough time - typically five years - to carry out ID research projects;
46) Evaluate research institutions with regard to their performance in ID research;
47) Fund research on the practice of ID research and team science, which in turn can improve the science and practice of ID.
2B/ Consolidate evaluation of ID research – *ex ante* criteria should include:

48) How the research topic requires an ID approach and how the combination of disciplines is expected to produce synergies in terms of outcome, i.e., how it is more than the sum of the parts;

49) A clear understanding of the disciplines used in the project and of how their combination will contribute to the project (justification);

50) An understanding of the potential of integration of insights produced by the disciplines;

51) A reflection on the design and about the validity of data that will be collected;

52) A concern for the management of the collaboration (e.g. leadership, partners’ engagement) and the potential difficulties associated with interdisciplinary research;

53) How the project represents a new (and sustainable) line of research;

54) How the project will feedback into the discipline in case of fundamental research (added value for the disciplines involved) and how it will contribute to solve the problem in applied research.
66 recommendations

2C/ Consolidate evaluation of ID research – ex post:

55) Extend the duration of the timeframe for evaluation because it takes time to build an ID research project. A timeframe of five years is suitable for most ID research projects;

56) Differentiate expectations depending on the types of research. In basic research, the added value for the disciplines involved is an important criterion while the contribution to solve a societal problem is paramount in applied research;

57) Strengthen the evaluation of performance by using combined approach to measure the success of ID research including conventional publications related metrics and also qualitative criteria;
2D/ Select the panel carefully:

58) Ensure a fair representation of disciplinary experts who need to be chosen for their experience with ID research, the breadth of their disciplinary understanding, and their openness to other disciplines;

59) Select a chair with proven experience and competence in ID research;

60) Establish and clearly communicate the criteria that experts should follow. In top-down ID research, expected societal impact should be high on the list while the contribution to the disciplines is essential in bottom-up ID research;

61) Provide structured training (e.g. through a multi-day participative workshop) for disciplinary researchers that need to evaluate ID research projects;

62) Include policymakers, professionals working in industry, and practitioners in the evaluation committee, especially for top-down ID research.
Third target: Publication and valorisation of ID research

63) Create new journals with a review process tailored for ID research;
64) Prepare special issues in highly ranked disciplinary journals on highly topical ID themes;
65) Organise joint events with other professional societies on common themes;
66) Develop flexibility in the format for submission, so that papers in social sciences may also be submitted in natural science journals.
ID is a vital complement to the disciplines – mutual benefit in a virtuous circle

There is a lot that can be done – look for appropriate incentives and rewards

Major benefits for universities
✓ Strengthen research and teaching
✓ Increase impact (economic and societal)
✓ Achieve societal gains and social responsibility