

Strategies for excellence in engineering education: developments in global best practice

13th June 2024
SEFI Deans Convention 2024

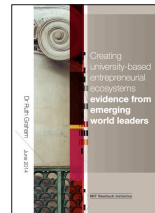
Dr Ruth Graham



Outline of session

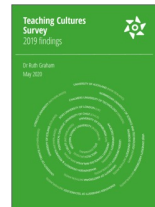
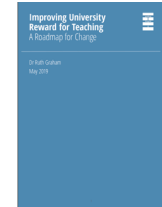
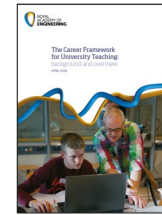
What

1. Emerging global best practices in engineering education

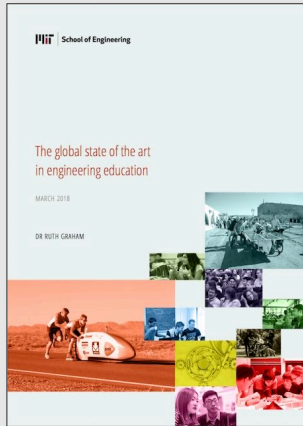


How

2. Facilitators of educational change
3. Global shift in how teaching is rewarded in academic careers



The global state of the art in engineering education

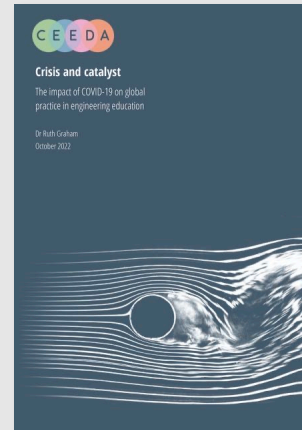


Commissioned by MIT

178 interviewees from
18 countries

Published March 2018

Crisis and catalyst: the impact of COVID-19 on global practice in engineering education



Sponsored by
university consortium

226 interviewees from
36 countries

Published Oct 2022

The 10 institutions most frequently identified as **current leaders** in engineering undergraduate education

1	Olin College (US)
2	MIT (US)
3	Stanford Uni (US)
4	Aalborg Uni (Denmark)
5	TU Delft (Netherlands)

6	UCL (UK)
7	Purdue Uni (US)
8	NUS (Singapore)
9	Uni of Cambridge (UK)
10	Chalmers Uni (Sweden)

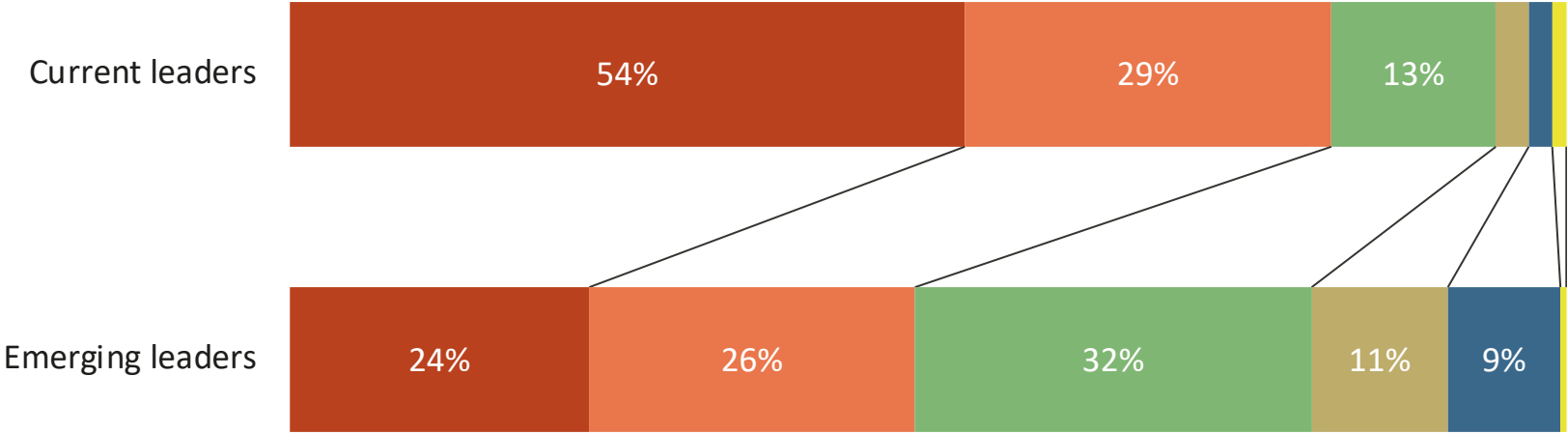
The 10 institutions most frequently identified as **emerging leaders** in engineering undergraduate education

1	SUTD (Singapore)
2	Olin College (US)
3	UCL (UK)
4	PUC (Chile)
5	Iron Range (US)

6	NUS (Singapore)
7	TU Delft (Netherlands)
8	Charles Sturt (Australia)
9	Tsinghua (China)
10	Arizona State (US)

The locations of **current** and **emerging** leaders:

- North America
- Europe
- Asia
- South America
- Australasia
- Africa



Key emerging themes amongst globally-recognized programmes:

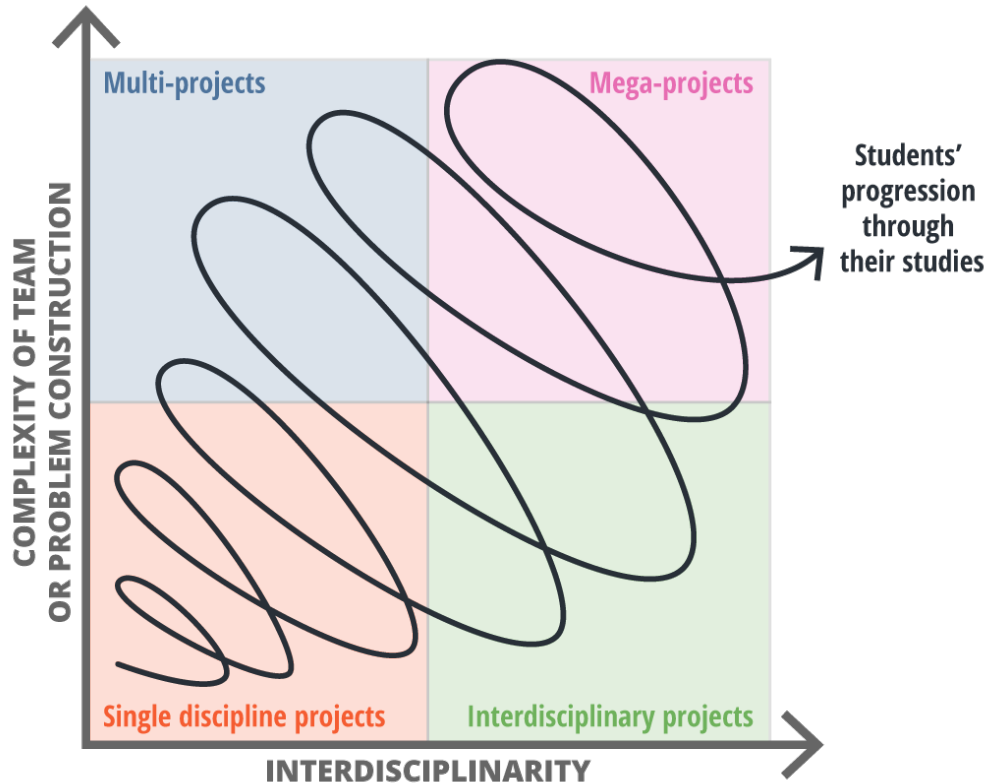
1. Offering authentic active, experiential learning at scale
2. Fostering student mindsets, such as identity and wellbeing
3. Delivering integrated and interconnected programs that progressively build student competencies
4. Offering diverse and flexible student assessment
5. Educating socially and environmentally responsible change-makers
6. Offering student choice, flexibility and multi-disciplinary learning

Example 1: Aalborg University (Denmark)



Aalborg University (Denmark)

Example 1: Aalborg University (Denmark)



Increasing project complexity

Building in complexity – technical, societal and inter-disciplinary – as students progress. Culminating in ‘mega-projects’ in final years of study.

Mindset development

Nurturing and tracking progressive learning outcomes (*PBL Competencies*), guided by structured self- and peer-reflection sessions.

Example 2: Tec de Monterrey (Mexico)



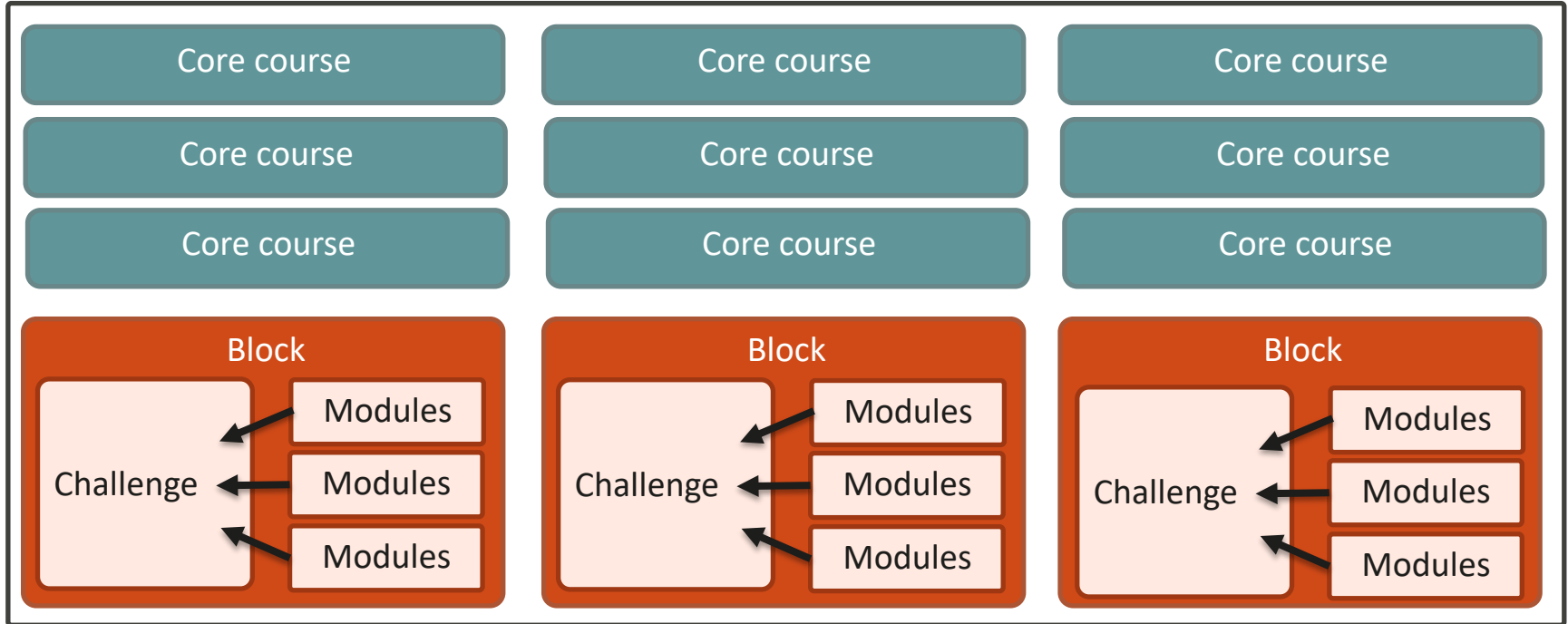
Tec de Monterrey (Mexico)

Example 2: Tec de Monterrey (Mexico)

5 weeks

5 weeks

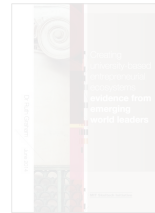
5 weeks



Outline of session

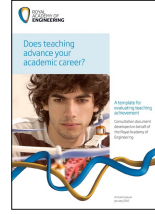
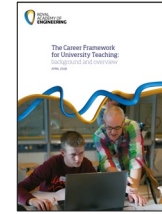
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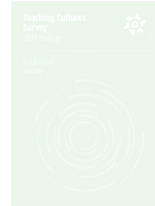
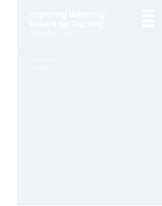


How

2. Facilitators of educational change



3. Global shift in how teaching is rewarded in academic careers



Common features amongst next generation of leading programmes:

1. **Leadership and vision:** effective leadership that promotes clear vision

Leadership and vision: Arizona State University (ASU)



ASU: President Michael Crow

The educational transformations at Arizona State University (US) has been focused specifically on supporting the health, opportunity and economic development of the state of Arizona, with initiatives supporting community engagement, flexible online learning and workforce development.



Common features amongst next generation of leading programmes:

1. **Leadership and vision:** effective leadership that promotes clear vision
2. **Evidence-informed practices:** robust pedagogical training and support; learning from research and evidence-informed practices



Aalborg University: IAS-PBL



Tec de Monterrey: Institute for the Future of Education

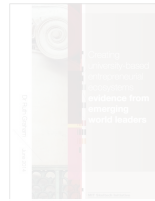
Common features amongst next generation of leading programmes:

1. **Leadership and vision:** effective leadership that promotes clear vision
2. **Evidence-informed practices:** robust pedagogical training and support; learning from research and evidence-informed practices
3. **Collegiality:** collaborations at all levels of the university
4. **New educational technologies:** developing and adopting new educational technologies
5. **Flexible systems and resourcing:** breaking down silos (e.g budgetary or disciplinary) and flexibility in government/regulatory requirements
6. **Rewards systems:** incentivizing excellence and innovation in teaching

Outline of session

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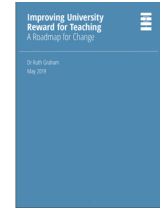


How

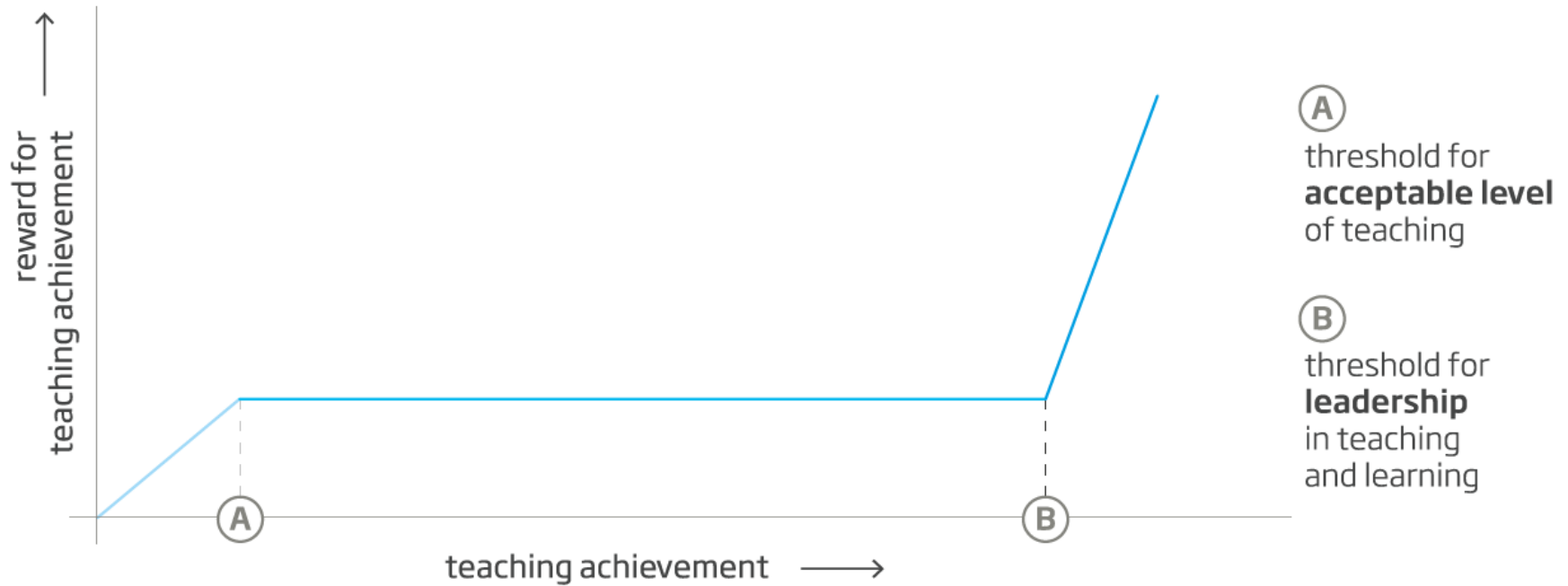
2. Facilitators of educational change



3. Global shift in how teaching is rewarded in academic careers







Challenges:

- › the absence of clear and accepted **definitions** of progressive 'levels' of teaching achievement that punctuate each stage of the career ladder
- › the inadequacy of the forms of **evidence** currently used to demonstrate and evaluate the teaching contribution of academics at each stage in their career progression
- › a clear **commitment to change** that is supported by university leadership, unions/senate and the wider academic community



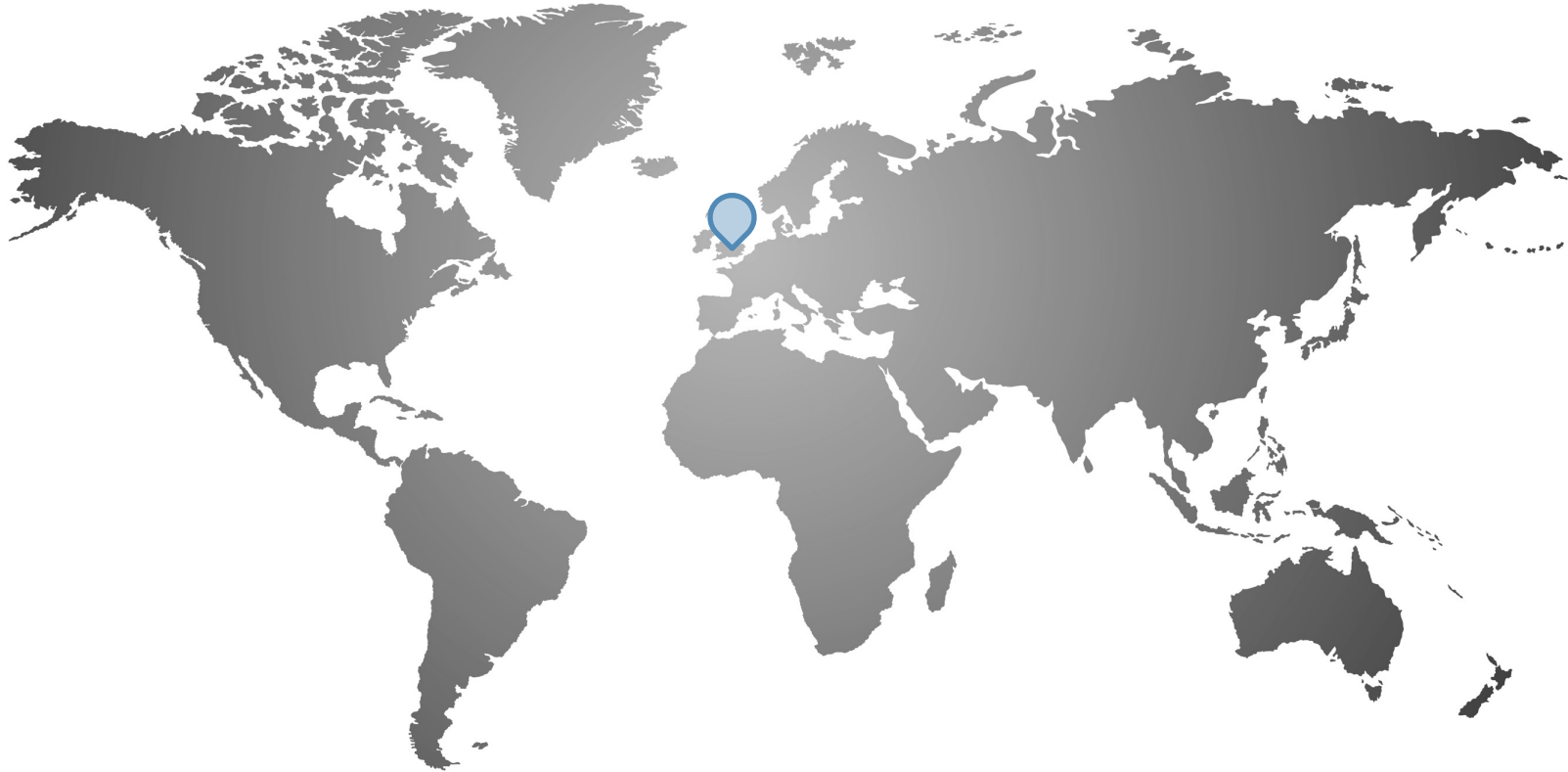
Global mapping:

Mapping the global movement for change to the reward of university teaching and showcasing best practice solutions from across the world

October 2023 – October 2024

Interviewees to date: 107 from 22 countries

Institutional reform: UCL (UK)



Institutional reform: UCL (UK)

UCL Academic Careers Framework

In 2017, UCL launched its Academic Careers Framework for 2017/18 promotion round.

The Framework focuses on the candidate's impact across four domains: teaching, research, institutional citizenship and enterprise/external engagement. Candidates must identify which of these four domains is: a **threshold** ability, a **core** ability and an **extended/specialist** ability.

UCL are currently working to improve annual appraisals and educational leadership track.



National collaborations for change:

- **Denmark:** following a bottom-up model for change to career pathways, led by Danish university leaders
- **Malaysia:** government-led initiative, asking all Malaysian universities to implement new academic career pathways
- **Norway:** development of 'pedagogical merit' system to support the reward of teaching
- **Netherlands:** 'bottom up' collaboration, building on agreement of Rectors of Dutch research universities

National collaborations for change: Netherlands



National collaborations for change: Netherlands

Room for Everyone's Talent

Agreement by the Rectors of all 14 Dutch research universities, described as *"a new balance in the recognition and rewards for academics... includes placing less emphasis on the number of publications, and a greater emphasis on the other domains in which the academic is active, such as education and impact"*.

Under development at all research universities since 2020 to drive parallel reforms to academic career pathways and reward systems.



Room for everyone's talent

towards a new balance in the recognition and rewards of academics

- > **Diversifying and vitalising career paths**
We create more diversity in career paths and profiles for academics.
- > **Achieving balance between individuals and the collective**
We assess academics based on both their individual and their team performance.
- > **Stimulating open science**
We encourage academics to share their research outcomes with society.
- > **Focusing on quality**
In our assessments of academic performance, we increasingly focus on quality, content and creativity.
- > **Stimulating academic leadership**
We stimulate good academic leadership at all levels.

An infographic titled 'Room for everyone's talent' illustrating various academic and professional domains. It features icons for Education, Research, Patient care (in university medical centres), Impact, and Leadership. Each domain is represented by a hand holding a circular icon with a geometric pattern. Below these are illustrations of diverse people, a trophy, a document labeled 'Great idea', and a person holding a sign with a circular logo.

Teaching Cultures Survey



2019:
15,659 participants

2022:
11,614 participants



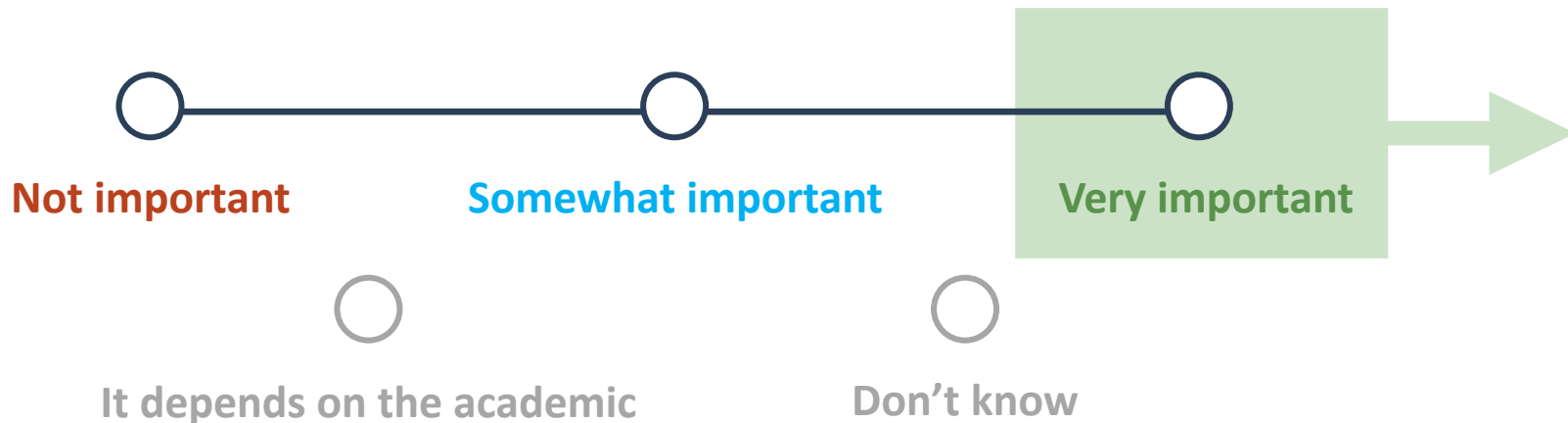
Academics experiences and priorities: promotion to full professorship

“How important **would you like** each of the following activities to be for promotion to full professor at your university (for a typical academic on a research/teaching contract)?”

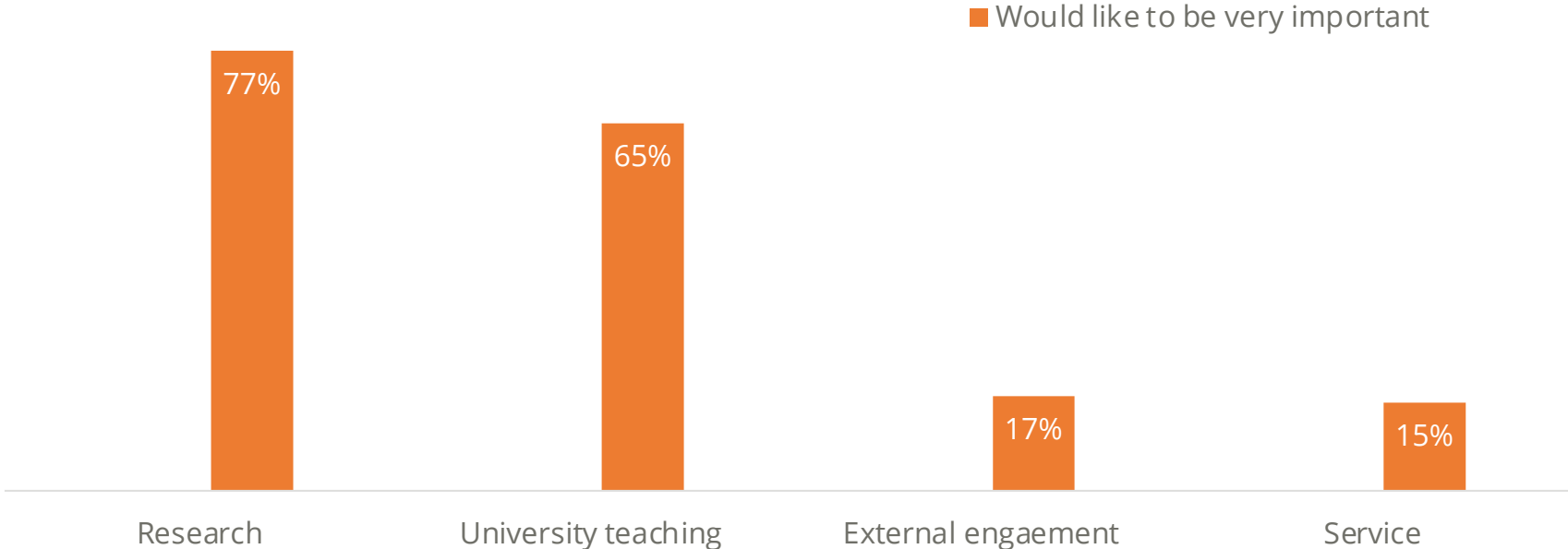
1. **university teaching**
2. **research**
3. **entrepreneurship**, enterprise & external engagement
4. **service** to the university / administration

Academics experiences and priorities: promotion to full professorship

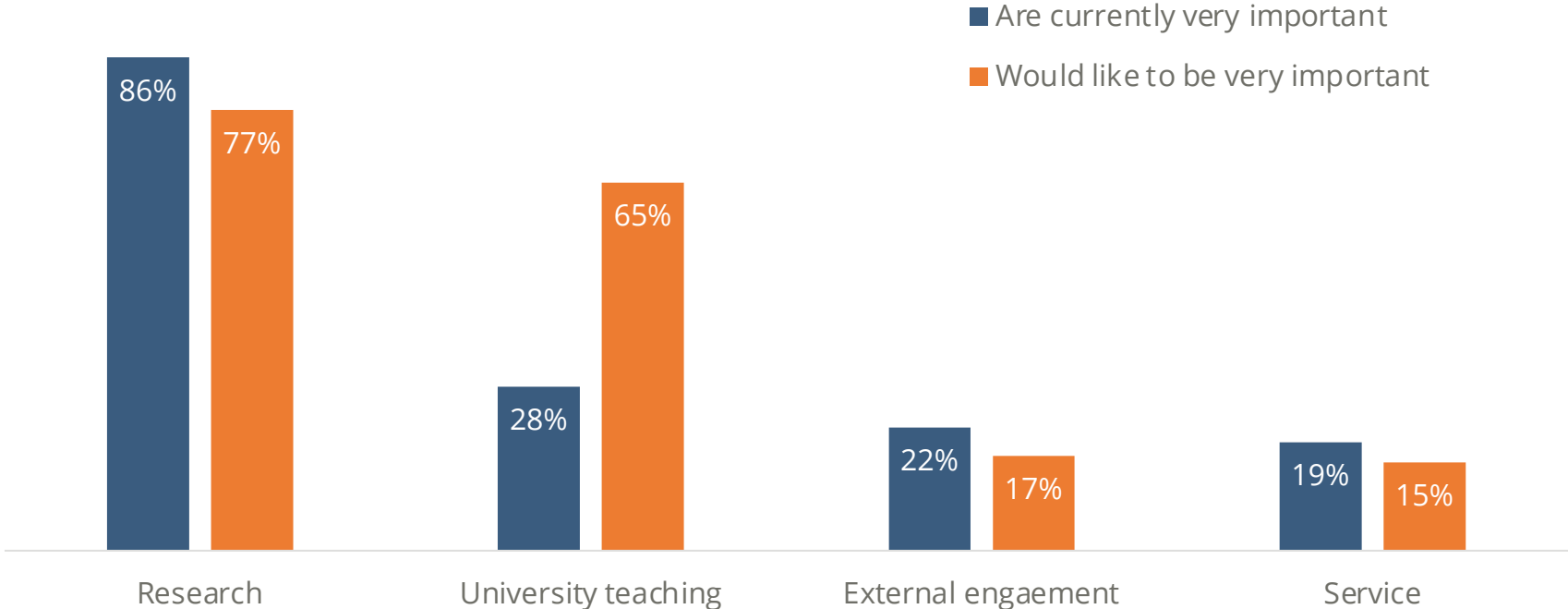
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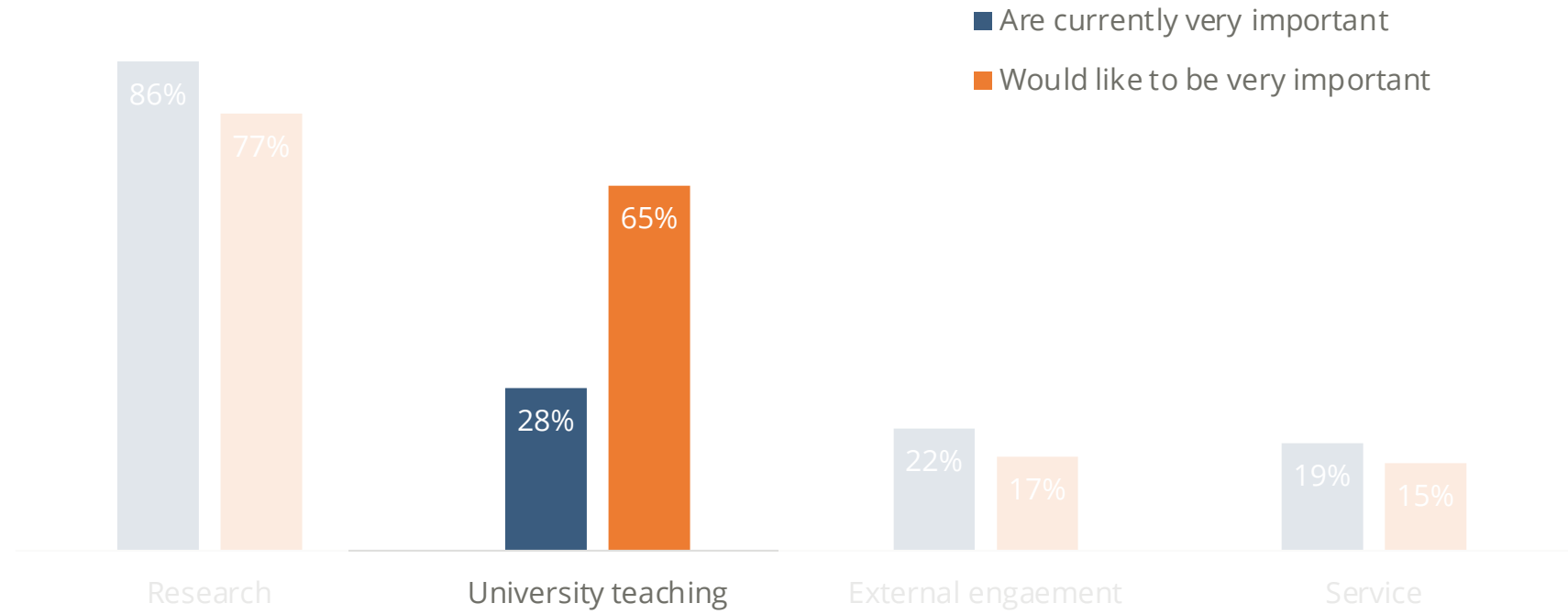


Respondents who would like each activity to be very important ...



... respondents who report each activity currently is very important





 <p>AALBORG UNIVERSITY DENMARK</p>	 <p>UNIVERSITEIT VAN AMSTERDAM</p>	 <p>THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tamaki Makaurau NEW ZEALAND</p>	 <p>CHALMERS UNIVERSITY OF TECHNOLOGY</p>	 <p>DTU</p>
 <p>THE UNIVERSITY of EDINBURGH</p>	 <p>TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY</p>	 <p>KING'S College LONDON</p>	 <p>Universiteit Leiden</p>	 <p>Maastricht University</p>
	 <p>NTNU Norwegian University of Science and Technology</p>	<p>Radboud Universiteit</p> 	<p>Skoltech Skolkovo Institute of Science and Technology</p>	 <p>SOAS University of London</p>
	 <p>TU Delft</p>	 <p>UCL</p>	<p>UNIVERSITY OF TWENTE.</p>	 <p>UNIVERSITY OF ICELAND</p>
 <p>UTM UNIVERSITI TEKNOLOGI MALAYSIA</p>	 <p>Utrecht University</p>	<p>VU 1585</p>  <p>VRIJE UNIVERSITEIT AMSTERDAM</p>	 <p>WAGENINGEN UNIVERSITY & RESEARCH</p>	<p>WESTERN SYDNEY UNIVERSITY</p> 

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Home About Framework Survey Global mapping Resources

Advancing Teaching

Global initiative to improve the recognition, reward and evaluation of university teaching

Latest updates

Overview

Universities across the world are striving to enhance the quality of the student experience; central to this mission is the establishment of an academic culture that celebrates, rewards and supports teaching achievement. Advancing Teaching is a global initiative to improve the reward, recognition and evaluation of university teaching. It is working with universities across the world to support and inform change to academic career pathways and institutional recognition systems.

Career Framework

The Career Framework for University Teaching is a resource to inform change to the institutional reward and recognition of university teaching

[Learn More](#)

Faculty survey

More than 20 universities worldwide are participating in the Teaching Cultures Survey, which tracks the academic teaching culture over time

[Learn More](#)

Global mapping

A new project, launched in November 2023, to map best practices in the global movement for change to the reward of university teaching

[Learn More](#)

www.advancingteaching.com

National collaborations

This set of videos showcases five countries that have established, or are in the process of establishing, national collaborations to reform university reward and recognition systems. Although each takes a different approach, all incorporate a major focus on improving the evaluation and reward of university teaching.



Introduction



Sweden



Malaysia



Denmark



Norway



Netherlands

Well-regarded university reward systems

A number of universities in the Advancing Teaching network have already implemented systemic reform to their academic reward and recognition systems. The videos below provide an overview of three that have been particularly influential, from: UCL (UK), the University of Wollongong (Australia) and Lund University (Sweden).



UCL (UK)



University of Wollongong
(Australia)



Lund University (Sweden)

Thank you

Publications:

Links to all the publications highlighted can be found at:

1. Dr Graham's website: www.rhgraham.org/reports
2. Advancing Teaching: www.advancingteaching.com/resources