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Towards Fully Purposing Universities to Deliver Public Benefit

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In leadership positions at UCL, we have spent more than a decade seeking to fulfil our university's founding commitment—inspired almost two centuries ago by the utilitarian philosopher Jeremy Bentham—to innovation, accessibility, and relevance for the benefit of humanity. Our guiding principle has been to make our institution and its activities greater than the sum of its parts. To enable us to have most impact in "sustainable human progress," we have focused our approach on cross-disciplinarity—by which we mean collaboration between experts in different disciplines that transcends subject boundaries—because the problems faced by society cannot be solved by research from one discipline alone. In recent years we have come to understand the boundaries between disciplines to be a subset of the many types of barriers—such as those between communities (disciplinary, academic and otherwise) and between different kinds of activity—that can inhibit the fulfilment of our vision to maximise our public benefit. In order to address crucial challenges—from the local to the global—we need to form collaborations across society that increase our mutual knowledge and engagement. We need to understand how the translation and application of knowledge will change in different settings and according to different practicalities. And we need to better reflect and enhance our role as convenors of different stakeholders to promote greater shared dialogue, co-creation and action.

Keywords: universities and higher education institutions, public benefit, research strategy, cross-disciplinarity, collaboration

> *Regrettably, the key question for our generation of researchers has become: "How will society survive to the 22nd century?"*
> –Professor G. David Price, UCL Vice-Provost (Research),
> Foreword to the 2019 UCL Research Strategy[1]

INTRODUCTION

The coronavirus pandemic has provided a stark illustration of a truly global challenge which has left no one unaffected. It has also highlighted the vital societal role played by universities, who have collectively mobilised their skills, knowledge, and expertise to work with governments, hospitals, industry, charities, and others to help tackle the effects of COVID-19, from analysing data and providing policy advice, to developing new treatments and exploring the longer-term

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[1]https://www.ucl.ac.uk/research/sites/research/files/uclresearchstrategy2019_final.pdf Accessed 20 October 2020.

impacts, implications and recovery. No other type of organisation has been capable of responding so immediately across such a broad sphere.

While the effects of coronavirus have been severe and far-reaching, it is not the only immense threat facing humanity. There are numerous urgent, pervasive and systemic challenges to our survival, wellbeing and prosperity—from climate change and inequalities to global security—with consequences likely to be even more severe than the pandemic.

The COVID-19 crisis has confirmed our long-held belief that universities have a unique capability to draw together the breadth of knowledge and expertise necessary to address global challenges. In this article we draw on some of our experiences at UCL in delivering on this conviction over the last decade. Our path was instinctual, experimental and iterative, and our lessons practical. We leave others to draw any theoretical conclusions.

A UNIQUE ROLE FOR UNIVERSITIES

A 2019 article observed, tongue in cheek, "Not long ago, universities said they solved problems. Now, many university leaders have upped the ante: their research will save the world."[2] Without wishing to appear arrogant, we hold that this is exactly what universities should aspire to do. This is not to say that universities alone will save the world: rather it is to assert their unique ability to advance knowledge and to work with partners across society to apply that knowledge to global problems.

The question posed in this special issue is highly salient, and builds on considerations of the (potential) transformative role of universities and the need for a new "socially robust" compact with society.[3] We do however, propose a slight nuance. In "re-purposing academic institutions for sustainable human progress," one must not lose sight of the constructive role which universities are already playing, nor the unique characteristics that underpin their potential to do more.[4] Foremost among these qualities and strengths are, in our view: first, the recognition of the inherent value of enquiry and discovery, in their own right and regardless of their application; second, the cultivation of academics' ability to determine their own research direction, based on their own curiosity about and commitment to their chosen subject area; and, third, the ability to investigate societal questions over the long term and from multiple perspectives.

We argue, therefore, less for "*re*-purposing" and more for "*fully* purposing" academic institutions to meet their obligation and potential to support sustainable human progress. In other words, those unique qualities form an essential prerequisite. The question then becomes how universities can bring those qualities fully to bear on societal challenges.

In leadership positions at UCL, we have spent more than a decade protecting these precious attributes, while also seeking to fulfil our university's founding commitment—inspired almost two centuries ago by the utilitarian philosopher Jeremy Bentham—to innovation, accessibility and relevance for the benefit of humanity.

OUR JOURNEY AT UCL

UCL is a large, multi-faculty university based in central London, with a research income of over £450 million in 2019/20. We have c.7,000 academics and researchers, and c.6,000 postgradute research students, working in 11 faculties across a significant breadth and diversity of academic disciplines.

The introduction of UCL's first (ever) research strategy in 2008 coincided with the growth of the "impact agenda" in the UK.[5] The latter prompted an increased focus on articulating the social and economic benefits of research, in addition to the value of discovery and development of new knowledge. Universities now increasingly make reference to the broader benefits of research and to ambitions in helping to solve societal problems. (In 2008, the UCL Grand Challenges programme—of which more below—was pioneering; since then universities around the world have adopted similar mechanisms to assemble expertise to tackle defined societal problems.)

Some might see a fundamental tension between, crudely put, academic freedom and institutional mission. At UCL we do not, although this does not mean there is a lack of tensions to be addressed along the journey.

Each university will need to balance these tensions in the way that is most appropriate for its own community. At UCL, in seeking to contribute to "sustainable human progress," we have encouraged our researchers to address long-term questions of high significance, influence the thinking of their peers, students and successors, develop the connexions of their work to other fields and practices, and maximise the public benefit of their insights. We seek to inspire and enable them to develop their research leadership through collegiality and collaboration, within and beyond the university.

In a nutshell, our aim has been to make our institution greater than the sum of its parts. A fundamental aspect of this has been encouraging what we call "cross-disciplinarity," by which we mean collaboration between experts in different disciplines that transcends subject boundaries. (We distinguish this from multi-disciplinarity, which brings multiple approaches but without necessarily synthesising them; and interdisciplinarity, which does not necessarily incorporate deep disciplinary knowledge in the same way.)

Cross-disciplinarity at UCL provides a flexible framework for individuals and groups to adapt their own preferred modes of working—from integrating disciplines and forging new fields, synthesising knowledge and developing challenge-based research, to undertaking research across and between several

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[2]https://www.insidehighered.com/views/2019/09/03/analysis-pros-and-cons-universities-grand-challenges-opinion Accessed 20 October 2020.

[3]Gibbons (1999) https://www.nature.com/articles/35011576#:\sim:text=A%20new%20contract%20must%20now,be%20both%20transparent%20and%20participative.&text$=$Modern%20science%20has%20until%20recently,and%20the%20rest%20of%20society Accessed 10 June 2021.

[4]Lozano et al. (2013) Editorial: Advancing Higher Education for Sustainable Development: international insights and critical reflections, In: Journal of Cleaner Production (48) pp.3–9 Accessed 4 May 2021.

[5]This term refers to the growing focus in research funding and assessment on generating and demonstrating economic and social, as well as academic, impacts from research over the past 15 years or so.

disciplines, and pursuing careers that move across and between disciplines, and between academic, non-academic, and non-university roles.

In the face of the complex, systemic and existential problems facing humanity, the significance of cross-disciplinarity is that collaboration between experts can produce a much more nuanced and holistic understanding of any given issue, and thereby generate solutions more fit for application in society.[6] It is also a foundational aspect of the broader engagement with external stakeholders necessary to enable their application. We have also found that it helps to provide a framework for discussion of wicked problems that asks what we don't know, as well as what we do, and questions who else we may need to learn from or work with to make progress.

CULTIVATING CROSS-DISCIPLINARITY

While there are many practical advantages to providing a single home for researchers from related disciplines—in UCL's case, within a set of departments and faculties—these homes risk creating disciplinary siloes that can inhibit the wide-ranging collaborations we wish to stimulate. Our approach to cross-disciplinarity has been to provide provocations to and facilitate engagement by academics; to tempt them out of their homes rather than mandating such engagement.

We introduced and developed a range of mechanisms in which researchers could participate when they recognised it would benefit their own aspirations. One such mechanism is UCL Grand Challenges,[7] stimulating thematic problem-focused activity to address societal challenges. This programme was initially organised around the themes of Global Health, Sustainable Cities, Cultural Understanding, and Human Wellbeing; in more recent years we added the themes of Justice & Equality, and Transformative Technology.

Over a little more than a decade, UCL Grand Challenges has brought many members of our research community into working groups to apply their collective expertise to diverse problems such as homelessness, energy consumption, migration and displacement, and antimicrobial resistance. It offers small awards (typically £2,000–£5,000) to support novel collaboration on specific issues. (Small grants have led to big things: for example, the Global Disability Innovation Hub,[8] now a major research,

teaching and engagement centre on the Queen Elizabeth Olympic Park, had its roots in one.)

UCL Grand Challenges has also organised major commissions, starting with the 2009 UCL–Lancet Commission on Managing the Health Effects of Climate Change[9], ultimately leading to the creation of the Lancet Countdown[10], which works to ensure that health is at the centre of how governments understand and respond to climate change.

Where our provocations and facilitations have resulted in academics forming a community of interest with a critical mass and an aspiration to achieve more, UCL has often responded by investing strategic seed funding to set this work on a more stable platform, from which they can become self-sustaining through the usual teaching and research routes. These bodies, now formally established cross-disciplinary departments and centres, include, for example, the UCL Institute for Global Health[11], the UCL Centre for Behaviour Change[12], and the UCL Institute for Sustainable Resources[13].

CULTURAL CHANGE

The organisational change which we have implemented has in some ways been very simple: ascribing greater value to cross-disciplinary and impact-focused activity; providing modest resources to facilitate meetings and conferences, and small grants; and creating new fora in which to convene those with similar problem-interests but very different disciplinary backgrounds. Bringing heads of department and deans of faculty on the journey has been important in building support for researchers' engagement in such activities.

These mechanisms have been reinforced by other institutional measures, including: research coordination and facilitation teams to support research funding proposals (particularly those which are cross-disciplinary); a revised framework for progression in academic careers[14], which explicitly values a wide range of different academic activities; an emphasis on Open Science and Scholarship to share the outputs of our research[15]; further development of research-based education; and strategies for public engagement, knowledge exchange and global engagement which emphasise the value of, and provide opportunities for, proactive societal engagement.

More significant has been the cultural change within UCL. We learned much in our early attempts to provide roundtables to bring academics from different disciplines together to examine a problem. The diversity of specialist knowledge, perspectives, terminology, methodologies and evidence could make communication problematic. Our participants were often

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[6]In the 2011 iteration of our research strategy, we set out to achieve this through delivery of a "culture of wisdom, that is an environment committed to the judicious application of knowledge for the good of humanity" (https://www.ucl.ac.uk/research/sites/research/files/UCL-Research-Strategy-2011.pdf Page 1, accessed 20 October 2020). "Wisdom" proved a term that sadly was not universally popular among academic colleagues, and by the following iteration we settled on alternative phrasing: "We want to stimulate disruptive thinking across and beyond our university to transform knowledge and understanding, and to tackle complex societal problems. We wish to help to enable society not only to survive to the next century—an urgent challenge requiring unprecedented collective action and partnership—but also to thrive, so that the lives of future generations are worth living: prosperous, secure, engaged, empowered, fair, healthy, stimulating, and fulfilling" (https://www.ucl.ac.uk/research/sites/research/files/uclresearchstrategy2019_final.pdf Page 5, accessed 20 October 2020).

[7]https://www.ucl.ac.uk/grand-challenges/ Accessed 20 October 2020.

[8]https://www.disabilityinnovation.com/ Accessed 20 October 2020.

[9]https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60935-1/fulltext Accessed 20 October 2020.

[10]https://www.lancetcountdown.org/ Accessed 20 October 2020.

[11]https://www.ucl.ac.uk/global-health/ Accessed 20 October 2020.

[12]https://www.ucl.ac.uk/behaviour-change/ Accessed 20 October 2020.

[13]https://www.ucl.ac.uk/bartlett/sustainable/ Accessed 20 October 2020.

[14]https://www.ucl.ac.uk/human-resources/sites/human-resources/files/ucl-130418.pdf Accessed 20 October 2020.

[15]https://www.ucl.ac.uk/library/ucl-office-open-science-and-scholarship Accessed 20 October 2020.

at the forefront of their disciplines, accustomed to being the leading expert in the room. Fostering a sense of community was important, but usually required nurturing the perception that they were in a "safe space," where it was acceptable to acknowledge ignorance. Many early conversations reached a tipping point with a comment such as, "I know what I mean by "x," but please explain what it means in your discipline."

Over the course of a decade, the concept of cross-disciplinary research grounded in disciplinary expertise has become central to how our university understands and projects itself. Many hundreds of UCL academics have been directly involved in Grand Challenge activities, but the "ripple effects" —the promulgation of a culture of collaborative working—have been much wider. As one academic colleague observed to us several years after the inception of UCL Grand Challenges: "I feel for the first time that I don't just work in my department but that I'm part of the wider university."

BEYOND CROSS-DISCIPLINARITY

In recent years, as we updated the institutional research strategy, we have come to understand the boundaries between disciplines to be a subset of the many types of barriers that can inhibit the fulfilment of our vision to maximise our public benefit. In order to amplify and inform our research we identified the need to cross conventional, but often artificial, boundaries—not only between disciplines, but between communities (disciplinary, academic and within broader society) and between different kinds of activity. In order to address crucial challenges—from the local to the global—we need to form collaborations across society that increase our mutual knowledge and engagement. We need to understand how the translation and application of knowledge will change in different settings and according to different practicalities. And we need to better reflect and enhance our role as convenors of different stakeholders to promote greater shared dialogue, co-creation and action.

Much of UCL's response to COVID-19 has been made possible because of our existing broad research base, our established culture of collaboration across academic disciplines, and our productive partnerships with National Health Service hospitals, commercial organisations, research institutes and others. We have been able to rapidly assemble cross-disciplinary teams and mobilise partnerships in order to address many aspects of the pandemic, such as: sequencing the virus genome; tracking infection within different communities; collecting real-time patient data; conducting surveys of public understanding and opinion; and developing rapid, low-cost vaccine manufacturing through Vax-Hub, a global consortium of industrial partners, associations and networks jointly led with the University of Oxford.

Development of the UCL-Ventura breathing aid offers a striking example of agile, cross-disciplinary application of research in partnership with industry. To address a shortage of ventilators in hospitals, a team of UCL engineers, UCL Hospitals clinicians and existing industry partner Mercedes-AMG High Performance Powertrains developed a breathing aid that can help

to keep COVID-19 patients out of intensive care. They reverse-engineered a Continuous Positive Airway Pressure (CPAP) device—based on an existing off-patent CPAP system—which can help COVID-19 patients with serious respiratory problems to breathe more easily and prevent the need for invasive ventilation. Within 100 hours of the team's first meeting, the first prototype of the new design was manufactured; within 10 days, the process of testing, obtaining regulatory approval and moving to full-scale production had occured; and within 1 month, 10,000 devices had been delivered. The designs and manufacturing instructions were made freely available, with almost 2,000 requests from 105 countries approved in the first 51 days of release. A colleague termed this one of many "pandemic partnerships in a hurry."[16]

Another sphere in which we have strengthened our capacity to engage is that of public policy. Over the past decade, we have focused on how our research community engages with policy stakeholders in order to support the greater use of evidence in the formation of public policy. Along with promoting discipline-specific research findings to relevant policy audiences, the UCL Public Policy programme[17] stimulates and facilitates cross-disciplinary, multi-stakeholder investigation of societal issues (for example on the communication of climate change, green innovation, structural inequalities, and mission-oriented innovation). Through brokerage to connect researchers and policy professionals—including through events, seed funding and a fellowships programme—UCL Public Policy enables collaborative approaches to tackling policy problems and the co-creation of knowledge. We are also working with other UK universities and policy partners through the Capabilities in Academic–Policy Engagement[18] project, to understand "what works" best in different institutional, geographic and policy settings to support collaboration between academic and policy communities and ensure that decision-making is supported through high-quality evidence and expertise.

It is increasingly apparent that engagement with stakeholders beyond academia is a critical aspect of how universities can deliver public value. The latest iteration of our research strategy committed us to "crossing boundaries" in order to increase such engagement, to better understand the problems we can help to address, and to foster collaboration and co-production with communities beyond our university. This includes, for example, fostering dialogues between academics, citizens and policymakers, and facilitating greater public participation in research. We recognise we still have a long way to go here.

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[16]An internal UCL analysis of the circumstances which made this project successful identified 12 key factors. These included:
- [the] ability to work in and across disciplines, with professionalism and mutual respect
- the importance of investing in, operationalising and optimising interdisciplinary workspaces
- having institutional support from dedicated, experienced, and incentivised professionals
- the importance of prior relationships, proximity, and strong ties among collaborators
- the importance of clear goals, trust, and lines of accountability
- the importance of knowledgeable innovation intermediaries.

[17]https://www.ucl.ac.uk/public-policy/ Accessed 20 October 2020.
[18]https://www.cape.ac.uk/ Accessed 20 October 2020.

Grand Challenges and Missions

The UCL Institute for Innovation and Public Purpose (IIPP)[19], established in 2017 by Professor Mariana Mazzucato, offers an embodiment of UCL's approach. The IIPP's cross-disciplinary work on "missions" offers new ways of tackling societal problems which have informed research and innovation policy in the UK and the EU. Missions identify explicit problems to be solved through cross-sector, cross-actor, and cross-disciplinary collaboration, using research and innovation to deliver societal value through multiple competing solutions. For example:

- The Commission on Mission-Oriented Innovation and Industrial Strategy[20] brought together UCL academics and world-leading industry experts from cross-disciplinary institutions to map out missions[21] for each of the Grand Challenges outlined in the UK Industrial Strategy[22] (as well as UCL's own Grand Challenges), including how to ensure the design of these missions are able to crowd-in investment and innovation across different actors and sectors in the economy in order to deliver sustainable and inclusive investment-led growth

- Professor Mazzucato's work for the European Union informed the development of research funding and the incorporation of missions as "an integral part of the Horizon Europe framework programme", with each setting "a mandate to solve a pressing challenge in society within a certain timeframe and budget."[23]

PUBLIC EXPECTATIONS

The UK has set an ambitious target to increase investment in R&D from 1.7 to 2.4% of gross domestic product by 2027, the result of a growing political consensus over the past two decades that investment in higher education and in research drives economic growth. As research funding accounts for a growing proportion of the public purse, we anticipate greater expectations of tangible public benefits in return—not least by each university's local and regional communities.

We predict an increasing shift towards a more explicit reflection of societal needs in the way in which research is designed, funded, undertaken and communicated, along with demand for new and expanded ways of engaging with non-academic stakeholders. Universities should be reflecting on what the compact between society and research should be, and how this reflects the shared aim of sustainable human progress. We should not simply be passive recipients of government directives and funder requirements here; rather we should seek to work with government, funders and other actors to shape the future research agenda, and respond to it in ways which are both societally relevant and true to universities' defining attributes and purpose.

Research by Britain Thinks on public perceptions of universities suggests that, at present, the importance of research[24] is often overlooked—but that when examples are highlighted it is seen as the single biggest benefit arising from universities. More recently, Public First has found that a majority of the UK population are proud of UK research—but that more work

is needed to foster public support.[25] There is an opportunity to help to build a broad public coalition around the crucial role that universities and university research have to play in meeting local and global challenges. It's time we upped our collective ambitions.

In particular, within the UK, universities need to think much more proactively about how they can collaborate with each other to develop effective cross-regional partnerships and networks that can support a connected knowledge and innovation ecosystem delivering local, national and global benefits. The COVID-19 pandemic has shown how universities can act in partnership with local organisations and communities to address the impacts of the crisis. This fluidity will need to be fostered to address the future challenges we will face, with universities playing a prominent role in the fabric of our economy and society.

Our own university is seeking to employ the UN Sustainable Development Goals (SDGs)[26] as a framework to understand better the shape of its own research, teaching and external engagement, and maximise our beneficial impact internationally, in the UK, and in London. The SDGs also provide a set of targets against which we can assess and improve the sustainability of our institutional policies and operational practices—so that as an organisation we can ensure our own house is in order, recognising that universities as institutions must acknowledge our own, sometimes problematic, role where planetary sustainability is concerned.[27]

THE ROAD AHEAD

At UCL, we have benefited from a clear and distinctive institutional ethos, but we recognise and value a diversity of missions in higher education. The institutional transformation

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[19]https://www.ucl.ac.uk/bartlett/public-purpose/ Accessed 20 October 2020.

[20]https://www.ucl.ac.uk/bartlett/public-purpose/policy/commission-innovation-and-industrial-strategy-moiis Accessed 20 October 2020.

[21]https://www.ucl.ac.uk/bartlett/public-purpose/publications/2019/dec/missions-beginners-guide Accessed 20 October 2020.

[22]https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges Accessed 20 October 2020.

[23]https://ec.europa.eu/info/horizon-europe/missions-horizon-europe_en Accessed 20 October 2020.

[24]https://britainthinks.com/pdfs/Britain-Thinks_Public-perceptions-of-UK-universities_Nov18.pdf Accessed 20 October 2020.

[25]https://wellcome.org/sites/default/files/public-first-advocating-rd-investment.pdf Accessed 23 November 2020.

[26]https://www.ucl.ac.uk/sustainable-development-goals/ Accessed 20 October 2020.

[27]See for example, Corcoran and Wals (2004) Higher education and the challenge of sustainability–problematics, promise, and practice; Ecological Literacy: Education and Transition to a Postmodern World. Albany, State University of New York Press.

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others seek should reflect their own purpose, culture and local setting. As a sector we should all recognise the ever-more fundamental and ever-more urgent role we must play across society.

The initiatives described above were instigated under the leadership of co-author David Price, then UCL Vice-Provost (Research). Shortly before final submission of this article, his portfolio was expanded significantly with the addition of UCL's London and UK remits, global engagement, innovation and enterprise, and public and cultural engagement. A test of this portfolio will be whether, through the removal of organisational siloes leading discrete activities, we are better able to support and stimulate the 'crossing of boundaries' that we feel underpins the delivery of public benefit.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.