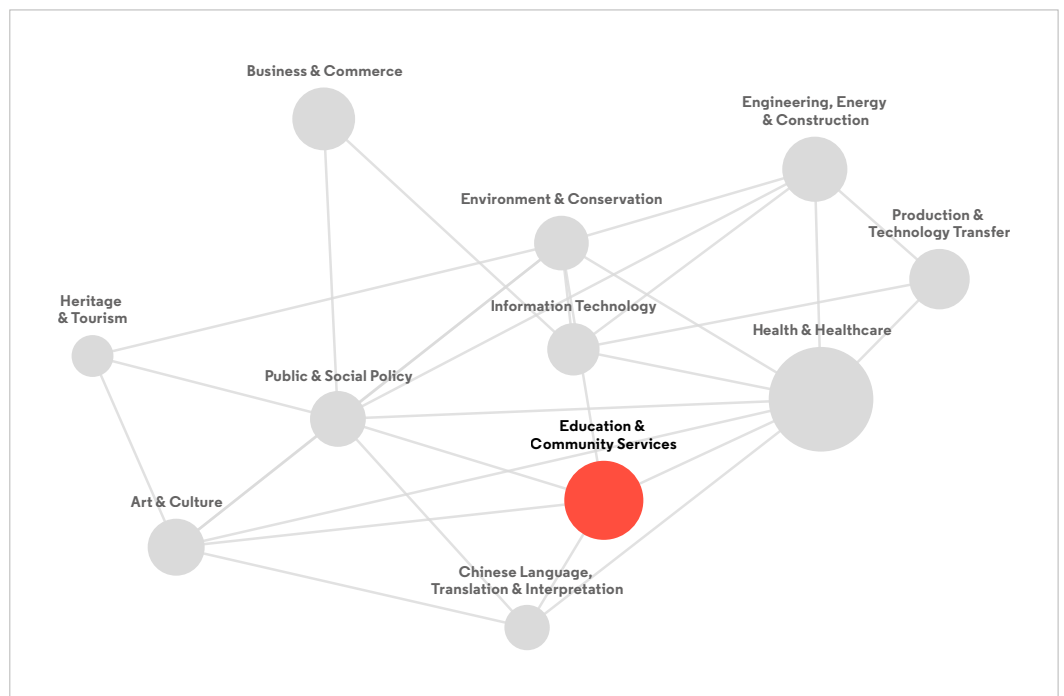# Clarivate™

**The societal impact of research
undertaken by Hong Kong universities:**

Education &
Community Services

A synthesis of the RAE 2020
impact case studies

Business & Commerce

Engineering, Energy
& Construction

Environment & Conservation

Production &
Technology Transfer

Heritage
& Tourism

Information Technology

Health & Healthcare

Public & Social Policy

**Education &
Community Services**

Art & Culture

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This report is part of a series of outputs that examines the impact of research arising from eight universities based in Hong Kong and funded by the University Grants Committee (UGC). The report focuses on the Impact Case Studies (ICS) produced by the UGC-funded universities as part of their response to a Research Assessment Exercise (RAE) in 2020. The overarching report - *The impact of research undertaken by universities in Hong Kong: A synthesis of the RAE 2020 impact case studies* – is accompanied by 11 thematic reports that examine the nature of research impact in different areas, ranging from Arts & Culture to Health & Healthcare. The 342 impact case studies that are analysed through this body of work are also available on a searchable database that is posted on the UGC's website.

The Education & Community Services cluster contains 44 impact case studies (ICS) from three primary topics identified in the topic modelling.[1] The cluster represents 13% (i.e. 44/342) of the case studies submitted to RAE 2020.

The impact wheel in Figure 1 illustrates how the Education & Community Services cluster is distributed across the 41 Units of Assessment (UoAs) used for RAE 2020. For example, not surprisingly for UoA 40 (physical education,

sport, recreation & physical activities), all three of the ICS (i.e. 100%) submitted to the UoA were in the Education & Community Services. Similarly, 10 out of 13 (77%) submitted to the UoA 41 (education) were included in this cluster, along with two out of three (67%) for UoA 37 (religious studies) and five out of ten (50%) for UoA 24 (psychology). The Education & Community Services was the second most (to Health & Healthcare) diverse cluster with ICS being submitted from 19 of the 41 UoAs as illustrated in the impact wheel in Figure 1.

Figure 1: Impact wheel for the Education & Community Services cluster (n=44)
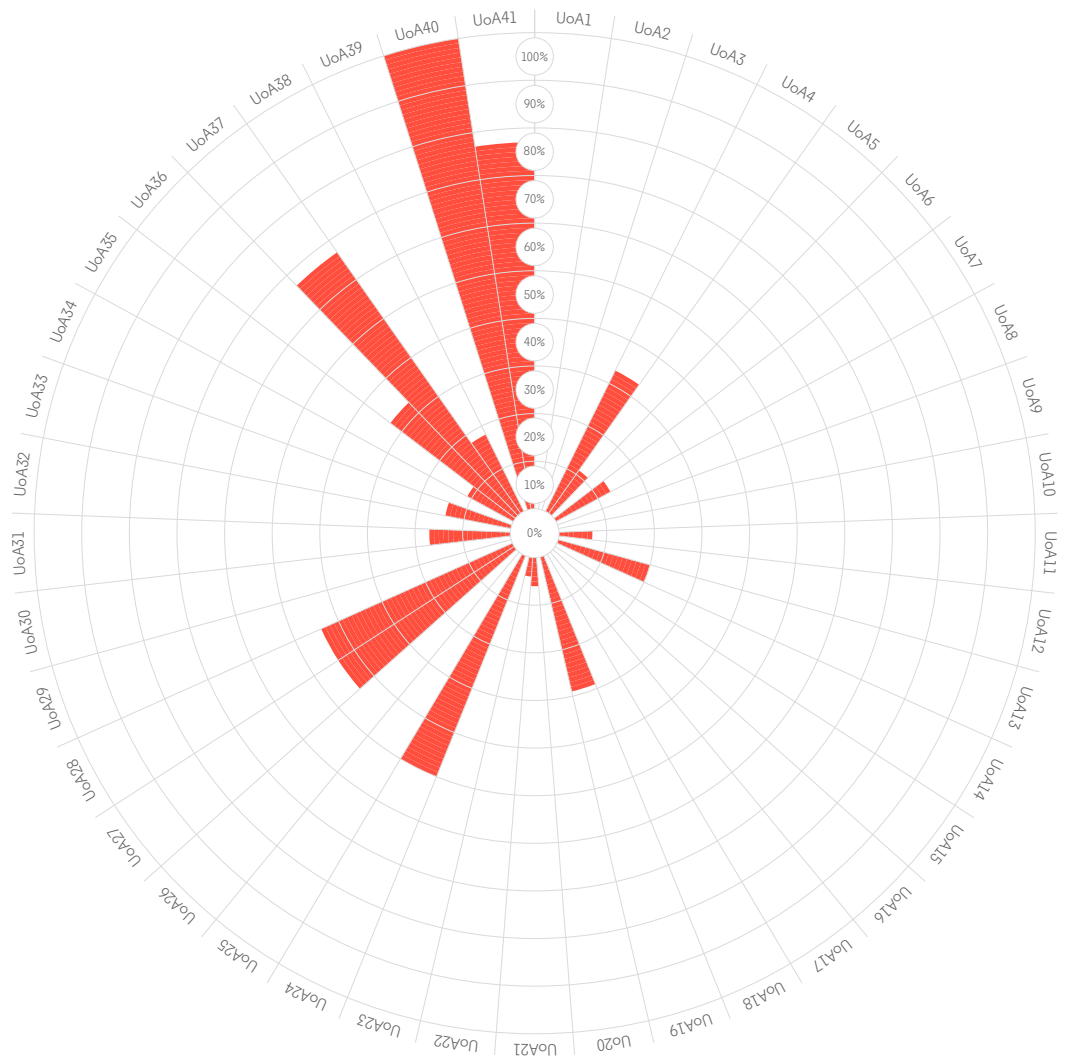
The impact of Hong Kong universities' research:
Education & Community Services

Table A shows the most salient features of the case studies in terms of beneficiaries, location, type of impact and time lag. It gives the percentage of case studies in this cluster that were tagged with sub-codes under these code headings, as well as the percentage of case studies tagged with those sub-codes in the entire sample of 342.

The 44 case studies in this cluster benefited three key sectors under the classification of the Hong Kong Standard Industrial Classification: 70% of case studies benefited the Education sector, 55% influenced Human health and social work activities, and 14% Public administration. The key socioeconomic group were children (77%), citizens/communities (32%), and marginalised and minority communities (27%). The key decision taker groups that were involved were government departments/agencies (45%), NGOs/third sector (27%) and politicians (11%). Beyond Hong Kong (89%) and Mainland China (5%), these case studies primarily had an impact in Singapore (16%) and South Korea (16%). The most salient type of impact was changing practitioners' attitudes, behaviours, or knowledge (59%), followed by informing government policy (57%), service or product in regular use (57%) and changing public attitudes, behaviours or knowledge (52%). On average, the research in this cluster was started in 2004, compared to 2006 for the whole sample. The median publication date for this cluster was 2014, slightly earlier than the median for the whole sample (2015).

On reading the ICS in the Education & Community Services cluster it was evident that the majority of ICS could be grouped into three main subthemes: curriculum and technology; access, participation and education policy; and community and youth services.

Table A: Some salient features of research impact identified in the Education & Community Services cluster (n = 44)

Beneficiaries of impact (top mentions)	% of <u>cluster</u> impact case studies	% of <u>all</u> impact case studies
Hong Kong Standard Industrial Classification		
Education	70%	18%
Human health and social work activities	55%	34%
Public administration	14%	14%
Sociodemographic group		
Children (under 18)	77%	20%
Citizens/communities	32%	17%
Marginalised and minority communities	27%	6%
Decision taker group		
Government departments/agencies	45%	31%
NGOs/third sector	27%	17%
Politicians	11%	4%
Location of impact	**% of <u>cluster</u> impact case studies**	**% of <u>all</u> impact case studies**
Hong Kong	89%	75%
Greater Bay Area (excluding Hong Kong)	0%	3%
Mainland China (excluding Hong Kong and GBA)	5%	12%
Singapore	16%	13%
South Korea	16%	8%
Type of impact (top mentions)	**% of <u>cluster</u> impact case studies**	**% of <u>all</u> impact case studies**
Change practitioners' attitudes, behaviours or knowledge	59%	31%
Informing government policy	57%	23%
Service or product in regular use	57%	28%
Change public attitudes, behaviours or knowledge	52%	30%
Elapsed time	**<u>Cluster</u>**	**<u>All</u>**
Median year of research commencement	2004	2006
Median year of publication date	2014	2015

Curriculum and technology

One key area of impact relates to curriculum development. Several ICS detailed impact of this type. In the first, researchers at The University of Hong Kong introduced an innovative program of Buddhist meditation and moral education into local secondary schools. The researchers developed a model for teaching meditation to students and educators in secondary schools and a "Buddhist Moral Education and Values" program, benefitting more than 20,000 teachers and students between 2013 and 2018. In the second, researchers from The Education University of Hong Kong developed new pedagogy, in collaboration with the Physical Fitness Association, that increased physical fitness literacy for over 19,000 children and their parents. It resulted in improvement in the physical activity levels of children aged 3 to 6 and led to curriculum improvements in 97 pilot schools. In a third, researchers from Hong Kong Baptist University developed artist-led visual arts pedagogical practices and education policy, which improved the quality of teaching and learning of visual arts in secondary schools. 10,000 people participated in the programme's public events and training activities, and more than 1,100 students from diverse backgrounds were involved. One striking ICS details how The Hong Kong Polytechnic University physics researchers developed the highly successful Hong Kong Physics Olympiad and Pan-Pearl River Delta Physics Olympiad, across Hong Kong, Macau and Mainland China, which involved around 9,400 gifted students. The researchers also provided content for marketable physics training programs for Hong Kong secondary schools and delivered physics mini-lecture series to 2,800 Hong Kong secondary students. In an ICS by The Education University of Hong Kong, researchers developed an innovative framework for conceptualising generic green skills to vocational educational and training curricula, which benefited communities and societies by helping to implement and sustain low-carbon economies. Two other case studies detailed similar impacts by developing pedagogy using local materials in teaching ethical reasoning and providing 21st-century skills using 'whole-person focused' and 'student-centred' teaching and assessment practices. Three cases related specifically to literacy. In the first, researchers developed pedagogical approaches and materials to help their students simultaneously learn the subject content and the English language, in the second, researchers implemented new kindergarten and early primary practices around developmental progression involved in children's literacy in Chinese and English, and in the third, researchers developed a new course on Chinese literacy for 3,000 teachers.

A range of case studies detailed curriculum development using technology. One example from this set is a four-year e-learning pilot on computational thinking education developed by researchers at The Education University of Hong Kong. This program of research pioneered the first curriculum of this kind in Hong Kong, benefitting 16,500 students and 112 teachers, and led a suite of reforms in policy and practice that influenced 537 primary school heads and more than 4,000 parents to better understand computational thinking in Hong Kong. Another example is the work of researchers at The University of Hong Kong, who created one of the world's most comprehensive websites offering free, open learning resources on critical thinking, which has been viewed by 8.2 million students, teachers, and other individuals globally. One ICS detailed the development of innovative technological and pedagogical tools for both online and on-campus education. Researchers developed an intuitive and interactive system of visualization tools, VisMOOC, which allows users to analyse learning data and provide feedback to MOOC instructors, students, and developers. Another interesting example relates to the development of new motion tracking and gesture recognition frameworks in a virtual reality environment, which led to a series of educational programmes that benefited over 7,000 learners and has been shown to be highly effective in facilitating learning. Another example is research from The Education University of Hong Kong, which created a framework for the integration of blended learning using information and communication technologies. Implemented in four local universities and in higher education institutions in Sri Lanka, Cambodia, Korea, Mongolia and Mainland China, this has allowed institutions to analyse their current blended learning practices to boost students' literacy and self-learning skills.

Access, participation and education policy

One area of impact relates to improving access and participation in education for individuals with disabilities and learning difficulties. One striking ICS describes how researchers at The Chinese University of Hong Kong developed a curriculum that uses social robots to meet the special learning needs of individuals with autism. The curriculum reduces autism severity and increases social and behavioural functioning of 3-18-year-olds with autism. It has been adopted by eighteen local and Macau non-government organizations and schools, which reported significant improvements in verbal and non-verbal communication and day to day skills. Another ICS detailed research from Hong Kong Baptist University on social and structural barriers to participation in physical activity for persons with disabilities' access and participation in physical activity. The team also conducted interventions around physical and psychosocial development of persons with disabilities' and inclusive participation, which led to two gold, three silver and three bronze medals at the Special Olympics World Winter Games in 2017. Another ICS reported the development of financial planning tools for people with cognitive impairment by researchers at The University of Hong Kong. One outcome was the establishment of a special needs trust in Hong Kong, which has benefitted 250,000 individuals with special needs and has now also been implemented in South Korea. Another ICS describes a collaborative project set up between The University of Hong Kong and the Heep Hong Society, which developed and evaluated a comprehensive service delivery model around special educational needs. The program was extended to 450 preschools and turned into a permanent provision for all preschools, benefitting 13,000 preschoolers with special educational needs in Hong Kong. One ICS from

The Chinese University of Hong Kong detailed research on improving basic literacy and mathematics skills. Three main outcomes included: a) development of a preschool dyslexia screening tool for early identification and intervention for 3,700 Hong Kong children, b) establishment of an early mathematics parent training program that improved children's school achievement and enriched parent-child bonding for thousands of Filipino families, and c) the creation of a MOOC on literacy learning, which attracted over 7,500 teachers and parents across 99 countries. A similar ICS described how researchers at The University of Hong Kong developed the first standardized Chinese dyslexia assessment instruments, which were taken up by all professional psychologists in Hong Kong. An associated literacy curriculum and standardised assessment tools, the Chinese Tiered Intervention Model (CTIM), has been taken up by nearly half of all Hong Kong primary schools (~200), significantly improving cognitive-linguistic and literacy skills.

Another area relates to educational policy. The first ICS in this area focuses on research by The Education University of Hong Kong that led to the abandonment of an ineffective government model of early childhood education funding. The research found that voucher-based marketization policy decreased educational quality and increased social and economic inequities, which led to a new funding model of direct subsidies for not-for-profit kindergartens. The benefits of this change included positive effects on the affordability of education, improved teacher-student ratios, and higher teachers' salaries, leading to higher education quality. A second ICS highlights research by the Hong Kong Baptist University that led to changes in the government's English Language education policy, which led to improved pedagogical practices and a substantial shift in the direction of English Language education. A third ICS details how researchers at

The University of Hong Kong study developed new assessment tools for population-level monitoring of early child development. These tools have informed governments' early childhood policies and has helped measure progress towards the achievement of the United Nations Sustainable Development Goal on children's health, learning and psychosocial well-being. In a fourth example in this area, researchers from The Chinese University of Hong Kong provided baseline indicators for benchmarking the quality and equality of Hong Kong basic education against international standards. This work led the Programme for International Student Assessment (PISA) to introduce a new parent survey and a new assessment tool, and saw Mainland China participate in PISA for the first time. In a fifth ICS in this area, researchers from CUHK worked with the Education Bureau (EDB) to design various development programmes for school leaders. Two of these programmes for school principals are now compulsory credentials for job incumbents, and the programmes for school managers/supervisors and secondary assistant principals are recommended by as preferred qualifications for new appointments. A related ICS details research by the Lingnan University Department of Economics that designed and executed a series of projects in collaboration with local education bureaus in Mainland China to address education inequality. The projects covered over 17 cities/prefectures, 300 schools and 50,000 students, with several initiatives improving test scores in underperforming schools. In a final ICS in this set, researchers used media, publications and cultural workshops create a nuanced understanding of migrant issues. This work has improved public knowledge and changed practices related to migrant communities, including improving medical services for ethnic minorities and adjusting the level of social benefits to asylum seekers.

Community and youth services

Several case studies related to community services. The first of these relates to smoking cessation and tobacco control. Researchers at The University of Hong Kong developed smoking intervention models that provided evidence for the Hong Kong government to increase smoke-free areas, raise tobacco tax, intensify visual warnings, and ban new tobacco products. This work has a direct impact on reducing smoking prevalence from 14.4% to 10% for Hong Kong adults and from 9.6% to 2.5% in adolescents from 2003 to 2017. One ICS in this area detailed The University of Hong Kong's development of an assessment tool to evaluate the health outcomes and care needs for Hong Kong Chinese elders. Having been adopted by Hong Kong's Social Welfare Department as the Standardized Assessment for Elderly Services, it has been used 160,000 times since October 2013, with an estimated saving of over HK$5.5b (cUS$0.7b). This has allowed elders to be matched with timely, appropriate services and effective allocation of public resources, leading to better health outcomes and improved quality of life. Two case studies dealt with illicit drug use. The first strengthened government policy on heroin rehabilitation, established a counselling model for methadone treatment, and combined vocational and peer support services for addicted people. The second informed sentencing guidelines for drug trafficking in Hong Kong, provided harm-reduction training for professionals, and improved local drug treatment organizations' programs and services.

A number of ICS gave details of impact on youth services. One notable example involved research from The Chinese University of Hong Kong that led to higher youth physical activity levels through rope skipping. 390,000 individuals from 340 schools benefitted from this moderate physical activity through grassroots outreach programmes and rope skipping is now directly promoted in government-led health campaigns. In addition, several Hong Kong world champions and elite athletes were developed with 311 medals in the Asian and World championships. Another notable example is an innovative 'positive youth development model' that tackled challenges facing adolescents (such as anxiety, depression, and substance abuse), developed by researchers at The Hong Kong Polytechnic University. Initially aimed at 210,000 high-school students in Hong Kong, the project's success led to it being adapted into a school-based intervention model in 237 schools. The program has benefitted more than 73,000 adolescents in Hong Kong between 2013 and 2019, promoting youth development and decreasing youth at-risk behaviour. In another ICS, researchers at City University of Hong Kong developed welfare and restorative solutions for at-risk youths. These were taken up by government policies, and practice models that benefitted tens of thousands of young people, their families and teachers across Macau, Hong Kong, and Singapore. Another interesting ICS from The University of Hong Kong details the world's first dental age assessment dataset for Asian ethnicity that has led to accurate age estimation for 252 previously undocumented children in India and China. Training more than 300 dentists and forensic practitioners regionally has enabled birth registration and access to schooling and health care for hundreds of previously excluded children. Other case studies highlighted impact arising from new assessment instruments developed to help young citizens make decisions related to further studies and career, from a program of workplace learning and counselling initiatives aimed at helping youth-at-risk to develop social and career competencies, from parenting guidance that emphasises local customs and ideas and from anti-aggression interventions that have reduced bullying and aggressive behaviour in schoolchildren.

The characteristics and translation of the underpinning research

Table B provides the salient features of the underpinning research. It provides bibliometrics as well as information on the impetus for the research and mechanisms/channels of dissemination.

186 outputs from this cluster are indexed on the Web of Science, which have a mean citation score of 2.54. The median citation score is 1.08, which is lower than the median of 1.59 for all case studies. Key international collaborators included the United States (17%), Australia (8%), and the UK (7%). 23% of the research was commissioned, and 16% was in response to demand for better protocols, practices, and policies. The research was often driven by investigator curiosity (16%) and followed on from previous work (14%). The main forms of co-production and collaboration were academic and public sector partnership (45%) and academic and third sector partnership (25%). The researchers were involved in the impact by being referenced as an expert or advisor (43%) and through published outputs being adopted by sector (39%). The research findings were disseminated primarily educational and training materials (66%) and through media coverage (52%). The ideas and products arising from the research were formally recommended by a recognised body in 27% of cases and the work was given prizes and awards in 27%.

Table B: Some salient features of the underpinning research identified in the Education & Community Services cluster (n = 44)

Analysis of underpinning research	Cluster impact case studies	All impact case studies
Bibliometrics indicators		
Number of outputs indexed on Web of Science	186	1445
Mean citation score	2.54	4.45
Median citation score	1.08	1.59
Collaborators location (top mentions, excluding China)		
USA	17%	18%
Australia	8%	5%
UK	7%	8%
Impetus for research (top mentions)	**% of cluster impact case studies**	**% of all impact case studies**
Pull factors		
Commissioned	23%	16%
Demand for better protocols/practices/policies	16%	8%
Push factors		
Investigator initiated research (curiosity)	16%	12%
Follow on from research team's previous work	14%	12%
Mechanisms/channels of impact (top mentions)	**% of cluster impact case studies**	**% of all impact case studies**
Coproduction & collaboration		
Academic - public sector partnership	45%	17%
Academic - third sector partnership	25%	8%
Researcher involvement		
Referenced as expert, practitioner or adviser	43%	33%
Published output adopted by sector	39%	10%
Dissemination of research findings		
Educational and training materials	66%	32%
Media coverage	52%	48%
Codification of impact eg prizes, patents etc.		
Prizes and awards	27%	33%
Idea/product/invention formally recommended by recognised body	27%	12%

The alluvial diagram in Figure 2 links the underpinning research (as classified by discipline using the 23 Web of Science, Essential Science Indicators (ESI), journal categories) to the 11 clusters identified through the topic modelling and the 13 Panels used in RAE 2020. The Education & Community Services cluster has been highlighted, with the impact pathways for the other clusters greyed out. Figure 2 illustrates the multidisciplinary nature of research impact; multiple journal categories feed into the cluster and the cluster contributes to ICS submitted to a range of RAE panels.

Figure 2: Alluvial diagram linking underpinning research with clusters and panels.
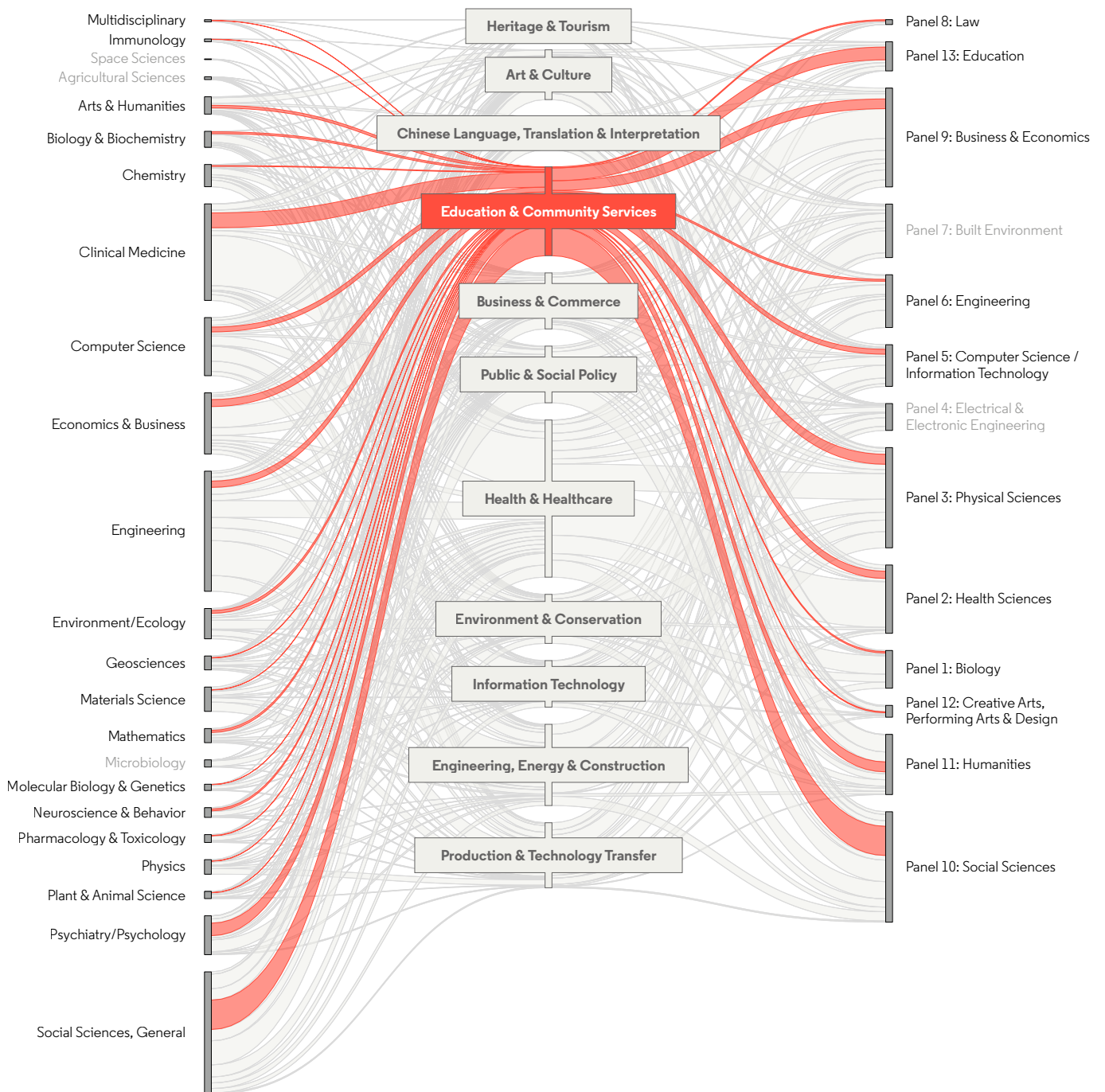
Methodological annex

This synthesised impact report presents a cross-cases analysis of the salient features in 342 impact case studies (ICS) provided by Hong Kong universities as part of the RAE 2020 evaluation. A sequential multi-method approach was employed. The first component involved quantitative topic modelling, followed by directed content analysis. This approach allowed the essence of the impact generated by Hong Kong universities to be captured and synthesised. It is important to note that the analysis and conclusions of these reports are based on the impact as described in the ICS. That is, the authors of this report took the case studies at face value and did not verify or question the narratives provided. A summary of the methodology is given below. For more detailed information on the methodological elements of this study, please see the overarching impact report.

Quantitative topic modelling

Quantitative topic modelling was used to identify overarching topics in the ICS. Topic modelling is a language processing technique applied to document sets to understand the different combinations of words or phrases (topics) that are present. It is a data driven approach, meaning results are not dependent on pre-conceived notions of structure, but are instead derived from the data itself.

Python, Scikit Learn, and Gensim packages were used to implement the topic modelling. Text from section 4 (Details of Impact) from the ICS was normalized (i.e. removal of punctuation and special characters), and domain specific stop-words were removed (i.e. words that are used frequently across the case studies). Various implementations of

the topic modelling algorithm were tested, and the Non-negative matrix factorization [NMF] was found to produce the most usable results. After testing multiple models using this algorithm, and manual review by the authors, the number of topics was set to 35 to provide a balance between the breadth of groupings and granularity of topics.

In discussion with UGC, the research team developed an initial taxonomy by grouping similar topics into broader 'clusters'. For example, the topics 'finance', 'accountancy and governance', and 'economics' were grouped into a cluster titled 'business & commerce'. Topic clusters were set at the outset of the analysis to ensure cognitively similar cases were read together, thereby improving the quality of coding, analysis, and impact reports. This classification system then informed the coding and testing of case studies.

Directed content analysis

Qualitative directed content analysis was then used to elucidate the salient characteristics of the impact narratives. This involved an iterative process of examining case studies and developing a code book to categorise their inherent features. The code book was derived from the existing literature and the domain expertise of the authors. It included four overarching categories: a) research, which captured funding source and impetus for research; b) time lags, which captured the elapsed time between the research and its impact; c) mechanisms/channels of impact, which included forms of collaboration and dissemination; and d) impact, which included beneficiary groups (e.g. young people, women, ethnic minorities), location and reach (e.g. Hong Kong, Mainland China, elsewhere), and the nature of impact (e.g. commercial, policy, practice).

Using the cloud based qualitative analysis software, Dedoose, each case study was read, and relevant excerpts were 'tagged' with the relevant codes. Multiple codes and subcodes were attributed to individual case studies. This allowed all case studies that had been tagged with a particular code (e.g. a particular beneficiary group) to be considered as a group. Two of the study's authors undertook the reading and coding (JG and KW). Inter coder reliability was ensured by double coding 10% of the cases (i.e. each author codes the same case study) and through regular coding meetings that were used to compare code applications and adjust the code book as required. The code book was thus a 'living document' that was reviewed and revised iteratively. This process allowed for cross case analysis that was the basis of synthesised impact reports. A code co-occurrence matrix was used to identify where the overarching codes intersect (for example, instances where particular topics are associated with particular beneficiary groups). The properties of the ICS were systematically examined, and evidence was gathered by assigning segments of text to unique codes within the broader coding categories. This process allowed for cross case analysis that formed the basis of this synthesised impact report.

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