

ANNUAL REPORT 2021/22

Recurrent Funding for Knowledge Transfer
for the 2019/20 to 2021/22 Triennium

submitted to
University Grants Committee



香港大學
THE UNIVERSITY OF HONG KONG

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EXECUTIVE SUMMARY

The 2021/22 academic year was another fruitful year for the knowledge exchange (KE) and knowledge transfer programmes of The University of Hong Kong (HKU) as we concluded the various initiatives in the 2019/20 to 2021/22 triennium. This report aims to summarise the key achievements and details of the programmes.

The prestigious university-level awards to promote and recognize KE had again attracted many outstanding applications, a testament to HKU's commitment to advancing KE and the stellar contribution of our academic staff to the community. The HKU Innovator Award 2021 went to Professor Tong Zhang whose innovative surveillance system has become an indispensable tool used by the Government to identify hidden COVID-19 cases in the community. The winner of the KE Excellence Award 2021 contributed significantly not only to local but also global oral health with the new paradigm of using silver diamine fluoride in arresting tooth decay. The Faculty KE Awards also showcased the many outstanding KE projects covering a wide range of areas, such as promotion of breastfeeding; the use of expressive arts for public health; and understanding the contextual factors that influence digital literacy to help guide policies and practices to help bridge the digital divide.

The Impact Project Funding Scheme continued to receive a large number of proposals, with 45 supported following a keen competitive process. A broad range of KE topics were funded, including the launch of an online consultation platform for Hong Kong cancer patients, as well as a smart platform that produces 3D-printed smart-customised protective masks.

On technology transfer, the year saw the efforts of HKU scaled to new heights as we further strengthened research collaboration with leading enterprises and institutions in the Guangdong-Hong Kong-Macao Greater Bay Area. HKU had embarked on six collaboration research projects with the Huawei Research Centre (HK). A memorandum of understanding was signed with the Asia Pacific Research Institute of Huawei regarding strategic research collaboration in November 2021. We are further discussing with Huawei for the establishment of a HKU-Huawei Joint Research Institute to deepen collaboration.

While Hong Kong continued to battle the COVID-19 pandemic, HKU continued to make significant contributions to the fight against the pandemic, including the development of a pioneering nasal vaccine that entered the phase III clinical trials in early 2022 in collaboration with the industrial partner Wantai Biopharm. Another new COVID-19 vaccine based on a DNA vaccine platform was also under development in partnership with the Immuno Cure Biotech Ltd in Hong Kong. In both cases, the Technology Transfer Office (TTO) has helped with patent work as well as commercialisation and facilitation of industrial partnership. HKU also

collaborated with the China National Biotech Group in developing Omicron-targeting vaccine, and the clinical trial was jointly launched at the HKU clinical trials centre in May 2022.

In the year, the Technology Start-up Support Scheme for Universities (TSSSU) funded a total of 20 projects, with 4 teams taking home the Grand Awards and the other 16 receiving the Seed Fund Awards. The total funding support was HK\$8 million.

On entrepreneurship development, iDendron continued to play an active role in the startup ecosystem in Hong Kong and the region through the iDendron Incubation Programme, SEED Programme, Gear Up Startup Seed Fund & Incubation Programme, professional services, Entrepreneurship Education, and Ecosystem support. Many accolades were received in the year. For example, ArchiREEF, a new start-up that created the world's first artificial reef structure 3D-printed in terracotta, was the champion of the Elevator Pitch Competition (EPiC) 2021 and recipient of the Gold Award in the International Exhibition of Inventions (IEIG) of Geneva 2022. Clearbot, another start-up, was the winner of the Alibaba Entrepreneurs Fund/HSBC Jumpstarter 2022 Global Pitch Competition.

As foreshadowed above, HKU participated in the IEIG Special Edition and won 12 medals including 4 Gold Medals in the event. HKU also participated in the Asia Summit on Global Health (ASGH) 2021 hosted by HKTDC as one of the Institution Partners, with various healthcare technologies and biotech spin-offs from HKU showcased in the event.

On public engagement, all Faculties implemented various activities including public seminars, press briefings, conferences, publications in the mass media, and two-way KE through new media such as online social media platforms, reflecting their commitment in this regard. HKU also hosted the 3MT 2022 Competition through a virtual format (video submission) from April to June 2022. The winner of the HKU 3MT Competition will represent HKU in the Asia-Pacific 3MT Competition in October 2022.

The quantitative indicators and financial report are also set out in this report.

1. DEEPENING INSTITUTIONAL CAPACITY FOR REALISING AND CORROBORATING IMPACTFUL RESEARCH

One of the key strategies of HKU is to enhance the institutional capacity for KE. To this end, we have organised awards to recognise excellence in KE; promoted sharing of best practices; and showcased exemplary practices. The awards are more than a recognition to the awardees – we wish to bring home the message that high impact KE projects are encouraged. To this end, the Impact Project Funding Scheme aims to support projects with the potential to deliver high impact in the realm of KE.

1.1 University-level Awards

The KE Excellence Award is a university-level award to recognise outstanding KE accomplishment that has made significant economic, social, environmental or cultural impacts to benefit the society. The 7th round of the university-level KE Excellence Award was organised successfully in the year, attracting many high quality entries that reflected the commitment of HKU staff to KE.

Recognising innovations through KE is equally important to spur the sharing of innovations with the broader community. The HKU Innovator Award and the HKU Young Innovator Award are the university-level awards established to recognise outstanding Faculty members whose innovations demonstrate exceptionally high potential impact (legacy or projected legacy) with transformative results to foster development. In contrast with the KE Excellence Award which requires evidence that the impact already exists, evidence of potential impact is also considered for these awards. Research-led innovation may take many forms, including the creation of distinctive and new products or models; commercialisation activity; entrepreneurial activity; social enterprise; or policy change. Riding on the success of the inaugural competition last year, the 2nd round of the HKU Innovator Award and HKU Young Innovator Award was organised in 2021/22. The winning projects demonstrated outstanding innovations with a clear potential of great impact in the future.

HKU Innovator Award 2021

Microbiome is closely linked to human health and environmental protection. Professor Tong Zhang of the Department of Civil Engineering and his team have been working on environmental microbiome and wastewater-based epidemiology for the past fifteen years. They invented quantitative assays using metagenomics and bioinformatics for those important microorganisms in wastewater treatment and environmental protection to improve the pollution control performance of the engineering facilities, and developed comprehensive analytical methods for the emerging biological pollutants (antibiotics resistance genes) as a worldwide leading

group in the field of environmental dimension of antibiotics resistance. Recently, Professor Zhang and his team designed the effective sewage surveillance systems to track the transmission of the SARS-CoV-2 virus and its variants in the community. The technology has been used to find the hidden cases in the population, thereby significantly contributing to the fight against the pandemic.



Professor Tong Zhang received the HKU Innovator Award for his exemplary achievements and the exemplary impact of his research work. More details of his innovation can be found in the KEO website at: www.ke.hku.hk/story/video/effective-sewage-surveillance-systems.

KE Excellence Award 2021: ‘Promoting Child Oral Health and Managing Tooth Decay in Preschool Children’



Tooth decay in young children is a public health issue not only in Hong Kong but also worldwide. The translational research and KE projects conducted in the Faculty of Dentistry, which aimed at promoting oral health and managing tooth decay in children, have achieved significant impacts.

One of the impacts was the establishment of a kindergarten-based dental care project, namely the 'Jockey Club Children Oral Health Project' funded by the Hong Kong Jockey Club Charity Trust. This is a territory-wide outreach project in which silver diamine fluoride (SDF) is used for controlling tooth decay among preschool children. The project enjoyed a very high participation rate and parental satisfaction. Studies by members of the team have shown that SDF is safe, inexpensive and effective in stopping tooth decay. The non-invasive and non-aerosol generating treatment with SDF is suitable for implementation in school setting, leading to a new paradigm for management of tooth decay in children.

The work of the winning team has also influenced the dental profession around the world, such as establishing new clinical guidelines on using SDF for children. They have also worked with the World Health Organization (WHO) to promote the global oral health policy in the use of SDF for oral health. As a result, for the first time, SDF was included in the dental section of the Model List of Essential Medicines published by the WHO in 2021. This document is currently used as a guide by more than 150 countries.

The team from the Faculty of Dentistry, comprising Dr Duangporn Duangthip, Professor Chun Hung CHU, Professor Edward Chin Man LO and Professor Cynthia Kar Yung YIU received the University's KE Excellence Award 2021. More details can be found in the KEO website at: www.ke.hku.hk/story/video/oral-health.

1.2 Faculty KE Awards

The 11th round of the Faculty KE Awards Scheme was organised in the year. The award scheme aims to recognise significant and exceptional KE impact of HKU academic staff in each Faculty. The responses were encouraging with high quality entries received. The three examples described below are among those recognised in the Faculty KE Awards Scheme in 2021/22.

Baby-Friendly Community Initiative Program – Development of a New Breastfeeding GPS App

To protect, promote, and support breastfeeding, the World Health Organization (WHO) and UNICEF developed the Baby-Friendly Hospital Initiatives (BFHI) as a global programme in 1991. Drawing reference to BFHI, the Baby-Friendly Community Initiative project aims to provide management and staff training to facilitate breastfeeding in public places as well as to foster breastfeeding friendly attitudes. In addition, the project has developed a brand-new breastfeeding mobile application which provides timely support and useful information on breastfeeding facilities to mothers. This 3-year programme had reached out to about 2,000 mothers and 2,000 staff and management of public venues. The research team held monthly

breastfeeding seminars and workshops for mothers and organised monthly training workshops for staff of public venues. They also engaged the community and participated in breastfeeding promotional activities and baby expos. The team also provided a platform of educational tips for the community and offered training for students and volunteer mothers as ambassadors.



According to the Hong Kong breastfeeding public perception survey, a knowledge gap existed on the needs and concerns of different stakeholders. To address this gap, guidelines were formulated for the management staff of shopping malls, restaurants and public venues to help them implement breastfeeding friendly measures. Community support through training and social marketing was

also provided to help sustain the momentum of the programme.

Research results from HKU and others indicate that more remains to be done to promote and support breastfeeding. The negative attitudes of some staff/management of public venues, cultural issues, as well as insufficient confidence of some mothers to breastfeed in public places would need to be addressed. The research team has shared their findings and transferred knowledge on evidence-based findings, and has achieved significant impacts on policy formulation, raising public awareness, and public education.

Dr Yuet Wan Kris LOK received the Faculty KE Award 2021 of the Li Ka Shing Faculty of Medicine. More details are at [Annex I-A](#).

Improving Holistic Wellness Across the Lifespan in the Community through Expressive Arts: from Research to Practice

Artistic expression plays an integral part in how we make sense of the world, and in understanding and communicating with others. In recent years, the value of arts in aiding recovery from illnesses, injuries, difficult emotions, and promoting well-being has been well recognized internationally. Professor Rainbow HO and her team have pioneered the application of the evidence-based Expressive Arts-based Intervention (EXABI) in wellness promotion, and prevention and management of clinical conditions in Hong Kong. The endeavour has shown promising health outcomes for individuals, healthcare providers, families, and the wider community, which in turn has helped promote the integration of the arts-based approach in mainstream professional and social services.

The team has been supporting Hong Kong to develop a healthcare system that aligns with the vision of the WHO on the impacts of arts on health and wellbeing as an intersectoral action to improve public health, reduce health vulnerabilities, str. The team is also the pioneer in conducting scientific research in this area. The team's efforts in research, knowledge exchange, and active community engagement will help open up new frontiers for the community, healthcare service providers, and policymakers.

Professor Rainbow Tin Hung HO and her team received the Faculty KE Award 2021 of the Faculty of Social Sciences. More details are at [Annex I-B](#).



Co-creating a New Normal of Empowered Learning through Digital Citizenship Research



The Learning and Assessment for Digital Citizenship Project (“eCitizenship”) is an interdisciplinary research project to study the impact of digital media on the learning lives of children and youth, and on their development as citizens in an increasingly technology-intensive and globally connected world. This multi-pronged study aimed to address the challenges of developing valid and reliable assessments of digital citizenship (conceptualized as a critical human capacity, with digital literacy (DL) at its core), and innovative methodologies to understand how various contextual factors would influence DL development.

The Wave 1 study findings released in April 2020 revealed huge diversities in digital literacy achievement among primary and secondary students within and across schools. eCitizen Education 360 was launched in May 2020 with wide support from the education sector, NGOs and charities as an action-focused comprehensive 360-degree survey study to guide evidence-based community-wide action to support the learning of students, families, schools and teachers under the “New Normal”.

Research on digital literacy assessment and the Wave 1 findings provide clear evidence that helped the public:

- recognize the multi-faceted nature of the student level digital divide, including DL competence, which is also connected with access at home to Internet-connected large screen devices, and for younger children, the opportunities to learn from/with other family members in the use of large screen devices;
- recognize the huge digital divide between schools and within school, and that overall the contribution of school e-learning provisions to students' DL achievement was low; and
- be aware of the urgent need to take community-wide action to address the digital divide and enhance the online learning capacity of students, teachers and schools.

Professor Nancy LAW and her team received the Faculty KE Award 2021 of the Faculty of Education. More details are at [Annex I-C](#).

1.3 [Impact Project Funding Scheme](#)

The University continued to organise the annual Impact Project Funding Scheme in 2021/22. This Scheme is an important enabler for academic staff to benefit the broader community with their expert knowledge and research. In the reporting year, 100 proposals were received, of which 45 were supported. Proposals are considered on a competitive basis. The list of the projects supported is available at the KEO website. Two funded projects are highlighted below.

Popularize Knowledge about Cancer Prevention and Treatment

Led by Professor Feng-Ming Spring KONG, Clinical Professor of the LKS Faculty of Medicine and a renowned expert in lung cancer clinical practice research, the project aims to establish a non-profit medical professional online consulting platform for Hong Kong cancer patients by gathering global multidisciplinary experts online to disseminate knowledge about cancer prevention and treatment. The platform would also answer some frequently asked questions from patients, their families and general public. This can help the public understand and follow the important principle about cancer care management in their daily life. This is also a good way to build people's confidence to fight cancer.

A Smart Platform for Healthcare and Better Living

By integrating advanced digital technologies, including Internet of Things (IoT), robotics, cloud-computing (CC), big data analytics (BDA), artificial intelligence (AI) and machine learning (MI), this project by Dr Hoi Hoi CHEUNG of the Faculty of

Engineering developed a smart platform that consisted of a 3D printed customised protective mask, a smart air cleaning and sterilising robot, a mobile application, and a cloud-enabled smart system to help minimise COVID-19 transmission and facilitate healthy living. The major impact will also include building a close collaboration with industry partners to develop innovative solutions for healthcare providers and healthy living, and motivating students to engage in experiential learning.

2. TECHNOLOGY TRANSFER AND INDUSTRY ENGAGEMENT

2.1 Strengthening Research Collaboration Partnership with Leading Enterprise in GBA - Huawei

HKU has been liaising and building partnership with the Huawei Research Centre (HK) in the past few years. As a starting point, an HKU-Huawei Industry Forum was organized in 2019 which was attended by a number of HKU professors and Huawei technology experts to discuss their latest research outcomes and future technology trends. Mutual understanding between the two parties was greatly improved and potential areas of cooperation were further discussed and explored after the event. Later, a collaboration agreement template was finalized and confirmed to facilitate the efficient establishment of new collaboration research projects between the two parties. Critical legal issues like intellectual property (IP) ownership and commercialization arrangements were all resolved after months of tireless effort contributed by the Huawei Research Centre (HK) and HKU Technology Transfer Office (TTO). Since the establishment of the collaboration agreement template, a number of collaboration research projects were consummated successfully in 2021 with tens of millions funding received for various research groups of HKU and a few more new projects are either started or under discussion in 2022.

In order to explore deeper and closer partnership in areas of mutual interests with reference to HKU's strategic research themes and Huawei's strategic development directions, Vice-President and Pro-Vice-Chancellor (Research) Professor Max SHEN met with Mr. Chengwu CAI, President of Asia Pacific Research Institute of Huawei and signed a MoU regarding strategic research collaboration between the two organizations in November of 2021. A few months later, a meeting was further arranged between Vice-President and Pro-Vice-Chancellor (Academic Development) Professor GONG Peng and Ms. Teresa HE, Director, President of HiSilicon, President of Technology of the 2012 Laboratories of Huawei, to explore the specific theme for collaboration. The MoU and follow up high-level management meeting marked a new beginning for both parties to explore a long-term and strategic partnership in the coming years. We believe the national policy of developing the Guangdong-Hong Kong-Macau Greater Bay Area will provide a solid foundation and great support for our future cooperation.



(Left) Professor Max SHEN, Vice-President and Pro-Vice-Chancellor (Research) of HKU met with Mr. Chengwu CAI, President of Asia Pacific Research Institute of Huawei in the MoU Signing Ceremony between HKU and Huawei on November 2021; (Right) Professor Gong Peng, Vice-President and Pro-Vice-Chancellor (Academic Development), Professor David Srolovitz, Dean of Engineering, Dr. Shawn Zhao, Deputy Director of Technology Transfer Office met with Ms. Teresa He, Director, President of HiSilicon, President of Technology of the 2012 Laboratories of Huawei who led a group of industry experts in the area of AI, microelectronics in HKU

2.2 HKU's COVID-19 Vaccine Breakthroughs via Industrial Partnership

Current vaccines for SARS-CoV-2 protects people from death and severe illnesses. However, the world needs more effective and powerful vaccines against the virus and its rapidly emerging variants. HKU researchers continued to work with industrial partners on new vaccines which may offer better protection and prevention.

Pioneering Nasal Vaccine Undergoes Phase III Clinical Trials

In early 2020, the HKU team led by Professor Honglin CHEN and Professor Kwok-Yung YUEN made a SARS-CoV-2 vaccine candidate based on a previously established flu-based DelNS1 live attenuated influenza virus (LAIV) platform. In a nasal spray form, the vaccine can block viral pathogens before they infect cells, and induce both mucosal and humoral immune response. TTO coordinated the patent filing and commercialization of this vaccine technology. This nasal vaccine has the potential to be a booster for people who have received other SARS-CoV-2 vaccines. Furthermore, it may be further developed into a dual vaccine against both seasonal flu and COVID-19 (<https://bulletin.hku.hk/research/fighting-back-against-covid-19/>).



The nasal spray vaccine manufactured by Wantai BioPharm

Another HKU's COVID-19 Vaccine being Tested in Human Trials

Professor Zhiwei CHEN developed a new injectable COVID-19 DNA vaccine based on a DNA vaccine platform he developed previously for an AIDS vaccine. This COVID-19 DNA vaccine can offer protection similar to that of mRNA vaccines while being cheaper and easier to produce and store. This vaccine is being tested in phase I clinical trial at the HKU Clinical Trials Center and the results so far show a satisfactory safety profile. It is being developed in partnership with Immuno Cure Biotech Ltd in Hong Kong, who has worked with companies in the Mainland that have certified manufacturing facilities for vaccine development. TTO has worked with the research team for patent prosecution, commercialization and industrial partnership to support the downstream development of the vaccine (<https://bulletin.hku.hk/research/fighting-back-against-covid-19>).



The DNA-based COVID19 vaccine developed in partnership with Immuno Cure Biotech Limited

Collaboration with China National Biotech Group (CNBG) in develop Omicron-targeting Vaccine

The Omicron variant has been shown to have a vaccine escape ability, which can compromise the efficacy and protection of the currently available vaccines. An Omicron-targeting vaccine is considered to be in urgent need. At the end of 2021, HKU researchers at the Department of Microbiology succeeded in the isolation of SARS-CoV-2 Omicron variant from clinical specimens four days after the first two Omicron cases were confirmed in Hong Kong. The team was the first known group in Asia to isolate the Omicron variant. HKU promptly started the collaboration with the China National Biotech Group (CNBG) in developing vaccine against the Omicron variant. In May 2022, CNBG and HKU jointly launched at the HKU clinical trial center the first clinical trial for an Omicron-targeting vaccine, which has the potential to be used by the public later this year. (https://hku.hk/press/news_detail_24616.html)



HKU and CNBG started the clinical trial on the Omicron-targeting vaccine

2.3 TSSSU@HKU

TSSSU entered the 7th year of operation in the year. We continued to follow the strategic, two-tier award allocation scheme to allocate the HK\$8M funding to selected companies. A total of 20 teams received the TSSSU@HKU Awards for FY2021/22. Among them, 4 teams received the Grand Awards, with each team granted a funding support of HK\$1M. The awardees are as set out in the table below. HK\$4M was awarded to the other 16 teams that received the Seed Fund Awards.

Company Name	Category	Description
MetTactics Limited	Biological Science	Provision of a precise microfluidic chip that for modelling cancer cells in metastatic state
ArchiREEF Limited	Biological Sciences	Provision of artificial reef tiles to facilitate conservation and protection of coral reefs
Kompass Medical Limited	Medicine	Provision AI-enabled medical image diagnosis technology for liver cancer diagnostics
Doctech HK Limited	Mechanical Engineering	Provision of advanced materials for future 3D IC packaging

2.4 Example of TSSSU@HKU-funded Company - [ArchiREEF](#)

ArchiREEF is a new start-up founded by Dr. David Baker and Dr. Vriko Yu of the School of Biological Sciences, Faculty of Science of HKU. The company provides a one-step solution to bring corals back and restore degraded marine ecosystems by planting corals more effectively. This is done by combining marine biology and the latest technologies in 3D printing techniques and material science to create artificial

habitats that are best suited for threatened marine life. The team created the world's first artificial reef structure 3D-printed in terracotta, which was truly ocean-friendly, and integrated the biomimicry element to enhance coral survivorship and growth. The company successfully developed pilot products and attracted early-adopter customer (ADQ) and will continue its market promotion through large media platforms. The team was the Champion of the Elevator Pitch Competition (EPiC) 2021 organized by the Hong Kong Science and Technology Parks Corporation (HKSTP) in 2021, and a recipient of the Gold Award in the International Exhibition of Inventions of Geneva 2022.

3. ENTREPRENEURSHIP DEVELOPMENT

3.1 iDendron

iDendron is HKU's Innovation & Entrepreneurship Hub. iDendron was launched in 2017 with the aim of nurturing entrepreneurial and innovative spirit on campus, incubating HKU early-stage startups, establishing interdisciplinary cooperation and engaging the community to support human endeavors and society developments.

iDendron manages several startup incubation programmes for businesses in different stages or sectors. It also organizes the 10-week Entrepreneurship Academy educational sessions once a year, which is open to the whole University as well as alumni and the public. iDendron is also an active part of the startup ecosystem in Hong Kong and in the region – it supports a wide range of entrepreneurial activities on campus and participate in external startup competitions through marketing partnership, team nomination, judging and mentoring.

Incubation services

Item		Remarks
Number of incubation programmes under management	3	
Number of startup teams under incubation	46	
Number of mentors from outside HKU for HKU students*	17	Including mentors for teams of HKU faculty and alumni

Table. iDendron's KPI for the assessment year 2021/22

*UGC Prescribed Performance Indicators

iDendron Incubation Programme

The iDendron Incubation Programme (iIP) is a 6-month incubation programme designed to accelerate the growth of high potential HKU startups through

mentorship, legal and professional support. iIP Cohort 4 started in May 2022 and supports 13 teams from a range of industrial sectors including robotics, quantum technology and financial technology.

The incubation programme has witnessed many successful cases. For example, recently an incubated company has been in negotiation with a seed fund investor; iDendron's legal support team has helped the company review and improve various investment related agreements.

SEED Programme

The SEED Programme is a 6-month co-ideation programme with HKSTP for supporting early-stage startup projects with entrepreneurship training opportunity, public exposure and up to HK\$100,000 seed funding from HKSTP's Ideation Programme. Various activities have been arranged to support these young businesses including startup clinic, startup mixer and pitching workshop. SEED Cohort 2 started in May 2022, and a total of 20 teams have been selected with background in social entrepreneurship, AI, green technology, etc.

Gear Up Programme

Gear Up Startup Seed Fund & Incubation Programme (Gear Up Programme) is funded by The Youth Development Commission under "Funding Scheme for Youth Entrepreneurship in the Guangdong-Hong Kong-Macao Greater Bay Area." It aims to provide entrepreneurial support and incubation services that befit the needs of young people who are about to start their businesses, helping them turn ideas into reality. Starting from October 2021 for two years, 14 teams would benefit from a range of support at iDendron including mentorship, legal and professional support and public exposure as well as up to HK\$600,000 seed fund from the Gear Up Programme.

Several teams have made great impact through competition awards and investment funding. For instance, ArchiReef, which was mentioned above, was one of the award-winning teams. Clearbot was the 2022 Winner of the Alibaba Entrepreneurs Fund/HSBC Jumpstarter 2022 Global Pitch Competition as well as the winner of the Best Presentation Award.

Entrepreneurship Education

The KPIs are as follows -

Item		Remarks
Number (hr) of workshops/seminars for teams	25.8	Including teams of HKU students, faculty and alumni

Number (hr) of individual mentoring, consultation sessions for teams	405	Including teams of HKU students, faculty and alumni;
Number of public lectures/symposiums/speeches to community audience*	10	
Number of student contact hours in short courses or e-learning programmes*	2,030	

Table. iDendron's KPI for the assessment year 2021/22

*UGC Prescribed Performance Indicators

Entrepreneurship Academy is a 10-week training in enhancing entrepreneurial mindset and skills. Speakers including venture capitalists, startup founders and domain experts are invited from the industry to share the experience on the global trends, current topics and strategies for market development.

The Entrepreneurship Academy's programme in 2022 was deferred to start in the 2nd semester. Starting from February 2022, 10 sessions had been organised to cover a range of topics from introduction of entrepreneurial skills to intellectual property right protection, social enterprises and the metaverse industry. A total of over 380 registrants from HKU students, staff and the general public joined the sessions. Each session had an average of 120-150 attendees with very positive feedback from the audience.

Ecosystem Support

Item		Remarks
Number of events we participated	44	Including 11 HKU events and 33 non-HKU events
Number of marketing channels	4	Including website, LinkedIn, Facebook and Instagram
Number of e-newsletter subscribers	4,146	
Number of knowledge transfer websites*	1	
Number of positive media impact related to knowledge transfer coverage, including print, on-line and e-media*	17	
Number of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies*	1	Yahsin Shen is a member of the Academic Committee for Postgraduate Diploma at HKU Space

Table. iDendron's KPI for the assessment year 2021/22

*UGC Prescribed Performance Indicators

InnoCarnival 2021

Entitling “Innovate for a Bright Future”, the InnoCarnival 2021 was organised by the Innovation and Technology Commission (ITC) of the Hong Kong Special Administrative Region Government, and took place in a hybrid format as a physical and online event from 23 to 31 October 2021.

Six novel HKU inventions were exhibited:

- Flu-based COVID-19 vaccine
- Microfluidic platform for metastasis detection and drug discovery
- Plaque cleaning apparatus using dental acrylic 3-D printing technique by micro-mist injection for elderly and disabled
- Utilizing monolayer molecular crystals to improve contact properties of organic field-effect transistors
- Improving the efficiency of UAVs; Efficient and accurate 3D reconstruction based on LiDARS
- Intelligent mobile robots for UVC based Disinfection



Special Edition 2022 International Exhibition of Inventions of Geneva

The International Exhibition of Inventions of Geneva (“IEIG”) is recognized as one of the most prestigious annual innovation exhibitions which is devoted exclusively to inventions and innovations. The organizers of the IEIG hosted a special virtual-only edition in 2022: Inventions Geneva Evaluation Days – Virtual Event (“IEIG Special Edition”). Inventors from all over the world participated in the 2022 IEIG Special Edition by presenting their inventions through a 3-minute video that would be judged by a panel of professional judges. Over 780 inventions from 25 countries and regions were evaluated by the panel of professional judges from around the world.

TTO coordinated HKU's participation in the IEIG Special Edition and won 12 medals at the event. Research teams from the Faculties of Architecture, Dentistry, Engineering and Science, and the LKS Faculty of Medicine took home 4 Gold Medals, 7 Silver Medals and 1 Bronze Medal with their inventions, an outstanding achievement signifying the prowess of the research teams and the impact of their projects.



HKU's award-winning inventions in 2022 are as follows:

Gold Medals

1. Fast-reconfigurable Large-area Interference Lithography Nanopatterning Platform
2. A Customisable in-manhole Sampling Robot for Sewage Surveillance
3. 3D Printed Reef Tile
4. Light-Triggered Drug Delivery System

Silver Medals

1. Anti-Covid-19 Stainless Steel
2. Disinfection Robot
3. Method of Purifying Nanodiamonds (NDs) and Application for Oral Hygiene
4. Micro Mist Scale mouthguard cleaning device
5. Non-contact, non-radiation device that accurately locates multiple implants in a patient's body
6. Nucleic Acid Aptamers for Malaria Diagnosis
7. NevGro® - a Dietary Supplement for Brain Health

Bronze Medals

1. PD1-Based Vaccine for Infection and Cancer Cure by Potentiating Host Immunity

(https://www.hku.hk/press/news_detail_24318.html)

Technology Transfer Promotion at the first Asia Summit on Global Health (ASGH)

HKU participated in the Asia Summit on Global Health (ASGH) 2021 hosted by the Hong Kong Trade Development Council (HKTDC) as one of the Institution Partners. 10 healthcare technologies and biotech spin-offs from HKU were showcased at the event to attract investors and industrial partners. Highlights include:

1. MetTactis Limited founded by Prof. Alice WONG from the School of Biological Sciences for modelling cancer cells in metastatic state with precise microfluidic chips;
2. Serinno Holdings Limited founded by Prof Xuechen LI from the Department of Chemistry for developing therapeutic drugs based on antibody-drug conjugate technology;
3. The expanded potential stem cell (EPSC) technologies developed by Prof. Pengtao LIU from School of Biomedical Sciences;
4. The exosome-based immunotherapy for cancer treatment developed by Prof. Wenwei TU from the Department of Paediatrics and Adolescent Medicine.

The onsite and online exhibition and matching meetings attracted more than 21,000 participants from 54 countries and regions.

4. COMMITMENT TO KNOWLEDGE ACCESS AND COMMUNITY ENGAGEMENT

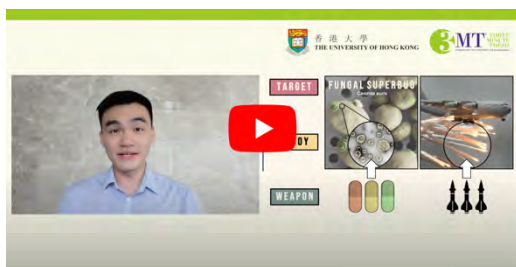
4.1 Faculties' Core Activity

All faculties are committed to public engagement to share knowledge and raise awareness on important issues facing society. Various activities were conducted in 2021/22, including public seminars, press briefings, conferences, publications on mass media, international competitions, and two-way KE through new media such as online social media platforms. For example, the LKS Faculty of Medicine organised a number of press briefings on COVID-19 disease including the novel nasal spray investigational vaccine, which is being studied as a prophylactic booster vaccine for COVID-19 disease (<https://www.hku.hk/press/press-releases/detail/23817.html>). Experts from the LKS Faculty of Medicine have also been appointed as Chairpersons or members of the Scientific Committees under the Centre for Health Protection of the Department of Health as well as the Chief Executive's Expert Advisory Panel to provide advice on vaccination and anti-epidemic strategies. The Faculty of Social Sciences organised a number of public KE lectures and seminars covering topics such as innovation for sustainable community and civil society.

HKU has continued to place emphasis on community engagement as well as collaboration with community partners in the KE programmes of the Faculties. While some KE activities had been put on hold due to COVID-19, many of the engagement projects had continued through different forms such as online webinars.

4.2 Strengthening Research Communication Skills for RPg Students

Virtual HKU Three Minute Thesis (3MT) Competition 2022



Since 2011, KEO and Graduate School of HKU have jointly organised the annual 3MT Competition, challenging final year research postgraduate students to explain their research within 3 minutes to a general audience.

In view of the COVID-19 pandemic, increasing social distancing measures and restrictions on public gatherings and travel, HKU 3MT 2022 was hosted again in a virtual format (video submission) from April to June 2022. The winner of the HKU 3MT Competition will represent HKU in the Asia-Pacific 3MT Competition in October 2022. The 3MT Competition continued to be well-received in the year, attracting quality submissions from young researchers and students and imparting upon them the importance of effective communications.

5. QUANTITATIVE INDICATORS AND FINANCIAL REPORT

HKU uses a broad definition of KE, hence our performance indicators include not only those required by UGC, but also other indicators that are germane to the University's KE efforts. Two tables on the UGC and HKU performance indicators are at Annex II.

6. LOOKING AHEAD

HKU is proud to have a long tradition of contributing to the community. KE, together with Teaching and Research, form the three pillars that underpin all the activities of HKU. Despite social distancing and other measures brought by the COVID-19 pandemic in the past two years, HKU's KE efforts have not been abated. Instead, we have continued to break new grounds and participated extensively in the fight against the pandemic, from the development of vaccines to the introduction of novel and effective disease surveillance technologies. Through various awards, programmes, and funding schemes, we have brought our KE and

knowledge transfer work to a new level. From the quantitative angle, we have achieved or outperformed in most of the performance indicators.

On technology transfer, incubation, and entrepreneurship development, we have also implemented various programmes and funding schemes with encouraging results in the current triennium. Many start-ups and joint projects have taken home trophies and accolades, which is a testament to both the quality of HKU's research and our quality technology transfer and other support services.

Yet we are not complacent with the achievements made. Looking ahead, HKU will review the KE strategies with a view to deepening and broadening our KE efforts. We will also strive to echo the national development goal of fostering collaboration with institutions in the Mainland and other places, with a view to developing the Guangdong-Hong Kong-Macao Greater Bay Area into a world class hub of innovation and advanced technology. We will also study ways to further enhance the impact of KE initiatives, and consider innovations for KE and technology transfer having regard to key local, regional and global development trends. The revised strategies will be set out in our next triennium plan.

The University of Hong Kong
July 31, 2022

University: The University of Hong Kong (HKU)
Faculty: Faculty of Medicine, School of Nursing
Title of case study: Baby-Friendly Community Initiative Program – Development of a new breastfeeding GPS app.
1. Summary of the impact (indicative maximum 100 words) Whether the global program Baby-Friendly Hospital Initiatives (BFHI) should be implemented in a community in Hong Kong has been a contentious issue. The University of Hong Kong (HKU) researchers established strong evidence that BFHI, a ten set of maternity practices that hospitals implement contributes to increasing the initiation, exclusivity and duration of breastfeeding. Our research has provided key evidence for the Hong Kong government to promote and support breastfeeding in the early postpartum period. Our Baby-Friendly Community Initiative (BFCI) program and breastfeeding (bf) GPS app has directly change behaviour and breastfeeding culture in the community. To date, 66 shopping malls/public venues have joined the BFCI programme and have enlisted 62 breastfeeding friendly premises that completed BFHI training. Among these, 12 premises were newly enlisted with existing breastfeeding rooms and 14 shopping malls has modified their breastfeeding rooms after joining the program. The bfGPS app was ranked number 3 in Hong Kong App store and have 1.4K users to locate breastfeeding facilities. In conjunction to the app, we have a Facebook Breastfeeding GPS page with 1718 followers from Hong Kong (69%), Taiwan (30%) as well as outside of Asia (~0.3%), such as Australia, United Kingdom and Canada, respectively.
2. Underpinning research (indicative maximum 500 words) Key HKU School of Nursing researchers: Dr Kris YW Lok (Postdoctoral Fellow, 2013-2016; Research Assistant Professor, 2016-2019; Assistant Professor, 2019-date) – Program leader Dr Daniel YT Fong (Associate Professor, 2012-date) Dr Janet Wong (Associate Professor, 2017-date) Professor Marie Tarrant (Honorary Professor, 2016-date) Since 2005, we have published 64 papers and received 10 grants (HK\$8.0 million) related to research on the underlying factors affecting breastfeeding, its epidemiology, and continuation, cessation, promotion and policy interventions. Our breastfeeding cohort studies on the impact of baby-friendly hospital steps in maternity settings show it affects breastfeeding outcomes (1-3, 5). Hong Kong has high initiation rates, with 90% of women breastfeeding upon discharge from the hospital. However exclusive breastfeeding rate at 6 months was 29% (4). This initiation rate is similar to those found in Department of Health Breastfeeding Survey. Prevalence of breastfeeding, its exclusiveness and duration, are affected by a multitude of social economic, cultural and environmental factors (2-5). In addition, we showed that maternal intentions and breastfeeding self-efficacy are important predictor of breastfeeding duration (6). In 2006, the Hospital Authority proposed the infant formula policy change, to no longer accept free infant formula products. Due to constraints on the obstetrics services in Hong Kong hospitals meant implementation was delayed until April 2010. We showed the effectiveness of this policy significantly changed rates of formula supplementation given to infants in the first 24 hours. Formula supplementation was reduced by 55% pre and post policy (2.70 vs 1.17). Consequently, this impacted on breastfeeding duration after hospitals stopped accepting free infant formula (1). After implementation of the infant formula policy, more mothers (41.3% vs 17.7%) exclusively breastfed during hospitalisation (1)(Grant 2). In addition, after implementing the policy we demonstrated that breastfeeding mothers were more likely to experience 6 Baby-Friendly steps (increased from 4.8% to 20.5%) (2).

Healthcare facilities are assessed on compliance with the ten steps of the BFHI and are designated as “Baby-Friendly”. In 2016, Hong Kong had their first designated Baby-Friendly Hospital. As of May 2021, there are three designated “Baby-Friendly” public hospitals in Hong Kong. Our prospective breastfeeding cohort studies (1, 4) of 2,369 mother-infant pairs (1,240 in pre-BFHI and 1,129 post-BFHI) showed that post-BFHI had 56% lower risk of not breastfeeding and not exclusive breastfeeding (4). We demonstrated the effect of hospital policy and the impact of BFHI steps on breastfeeding outcomes in hospital settings between 2006-2019 (1, 4).

The next step was to translate the BFHI steps into the community and commercial sector in conjunction with a comprehensive territory wide App on breastfeeding friendly care facilities. This was based on a qualitative exploratory study and needs assessment among mothers and public sector’s views of difficulties experienced breastfeeding in public (Grant 1, unpublished data). In 2018, Lok and colleagues secured a Health Care and Promotion Scheme Commissioned Grant (Grant 1). The project will collect data from 2,000 staff and management and 2,000 mothers and evaluate the BFCI program as evidence based protocol in the community (Grant 1).

3. References to the research (indicative maximum of six references)

1. Tarrant, M., **Lok, KYW.**, Fong, DYT., Lee, LYI., Sham, A., Lam, C., Wu, KM., Bai, DL., Wong, KL, Wong, EMY, Chan, NPT & Dodgson, JE (2016). Effect of a hospital policy of not accepting free infant formula on in-hospital formula supplementation rates and breastfeeding duration. *Public Health Nutrition*, 18(4), 2689-2699. DOI: 10.1077/S1368980015000117.
2. Tarrant M., **Lok, K.Y.W.**, Fong, DYT., Wu, KM., Lee, ILY., Sham, A., Lam, C., Bai, DL., Wong., Wong., EMY., Chan, NPT & Dodgson, JE (2015). Effect of Baby-Friendly Hospital Steps when hospitals implement a policy to pay for infant formula. *Journal of Human Lactation*, 32(2), 238-49. DOI: 10.1177/0890334415599399.
3. **Lok, KYW.**, Bai DL., Tarrant M. Family members’ infant feeding preferences, maternal breastfeeding exposures and exclusive breastfeeding intentions (2017). *Midwifery*, (53)49-54. DOI: 10.1016/j.midw.2017.07.003.
4. Shing, JS., **Lok, KYW***, Fong DYT., Fan HSL, Chow C, Tarrant, M. (2021). Effect of the Baby-Friendly Hospital Initiative and Maternity Care Practices on breastfeeding outcomes. *Under review*.
5. **Lok, KYW.**, Chow CLY, Fan HSL, Chan VHS, Tarrant M. (2020) Exposure to baby-friendly hospital practices and mothers’ achievement of their planned duration of breastfeeding. *BMC Pregnancy Childbirth*, 20(1):261. DOI:10.1186/s12844-020-02904-0
6. Lau, CYK., **Lok, KYW.**, Tarrant M. (2018) Breastfeeding duration and the theory of planned behaviour and breastfeeding self-efficacy framework: A systematic review of observational studies. *Maternal Child Health Journal*, 22(3):327-342. DOI: 10.1007/s10995-018-2453-x.

Key Grants:

Grant 1. Lok KYW et al. Baby Friendly Community Initiative Program, Health Care and Promotion Scheme - Commissioned Fund, Food and Health Bureau, Hong Kong Special Administrative Region (HKSAR). (5/2019 – 09/2022) HK\$3,500,000.

Grant 2. Tarrant et al. Changing infant feeding models: impact of cessation of complimentary infant formula in public hospitals on the duration and exclusivity of breastfeeding. Health and Medical Research Fund, Food and Health Bureau, Hong Kong Special Administrative Region (HKSAR). (10/2007-09/2013) HK\$321,484.

4. Details of the impact (indicative maximum 750 words)

Our research work (1-6) has laid down the knowledge and skills to successfully secure the Commissioned Grant (Grant 1) to deliver the benefits to the community. The BFCI program was to deliver seven of the ten steps relevant for protection, promotion and support breastfeeding in a community setting (Grant 1). The main objectives of BFCI is to create a breastfeeding culture in

the community. Step 6, which is unique to the BFCI, involves creating a welcoming environment for breastfeeding mothers in public places in the community. In 2020, Lok commenced a social media online polling, with approximately 200 participants to assess general public opinion. 77% of the participants reported it was difficult to find breastfeeding facilities in Hong Kong and 71% reported it was difficult to breastfeed in public [A]. Lok and colleagues conducted a surveillance survey that collected opinions of breastfeeding mothers as a needs assessment which laid down the ground work of the development of our testing version of breastfeeding GPS app (Grant 1). An environmental scan of the baby care facilities in public venues in Hong Kong was conducted. A total of 593 facilities were identified to have breastfeeding facilities and 552 have been included into our app during Phase 1 (Grant 1). A qualitative exploratory study was conducted to gain an in-depth insight into the experiences of participants who tested the Phase 1 app and their expectations using the app. A total of 59 staff and management and mothers provided feedbacks about our breastfeeding GPS app. Participants were asked to give suggestions until data saturation was reached (Phase 1). In conjunction to this, we developed the first social media mobile app with comprehensive territory-wide information on breastfeeding friendly care facilities in Hong Kong that changed behaviour and impacted the community culture.

Impact on behaviour change

The Breastfeeding GPS app was released on 28 September 2020 in both IOS and Android with over 2,500 downloads in May 2021. It was ranked number 3 in Hong Kong App Store's "Health & Fitness" free apps category in September 2020. The app usage data to date, May 2021 demonstrated impact and behaviour change with data below [B]:

- 1.4K+ users have used the app to locate breastfeeding facilities.
- All users performed 54K+ facilities searches:
 - 22K+ for searching nearby facilities with the user's GPS location; and 32K+ for searching with a specific district or landmark name.
 - Each user searched 37 times on average.
 - Each session of app usage involved 4.8 searches on average.
- All users viewed facility details for 20K+ times:
 - Each user viewed the detailed information of 14 facilities on average.
 - Each session of app usage involved 1.8 views on average.

Changes after the delivery of the app will be assessed. The ratings and evaluation stage will be launched in September 2021 with an interactive function for public to upload recent breastfeeding facilities. Expected impact will be to evaluate the ratings, comments and number of updates from users.

We have a Facebook [C] and Instagram page [C] launched in conjunction to the app that provide educational tips on breastfeeding and monthly breastfeeding workshops for mothers. Impact achieved to May 2021, we have 1,639 Facebook "likes" and 1,718 "followers" and a total of 242 "shares". Our followers are mainly from Hong Kong (69%) and have reached within Asia such as Taiwan (30%), Macau, Malaysia and Singapore (~0.5%) respectively. It has reached outside of Asia (~0.3%) such as Australia, United Kingdom and Canada respectively [D].

We conducted a random street media interviews to outreach and obtained public views of the general difficulties for public and the use breastfeeding mobile app. The video post had received "2.8k" views and "11 shares" in September 2020 [E]. In addition, working together with shopping malls, we contacted 66 shopping malls and two have adopted this video in their shopping mall as promotional videos [F].

As of May 2021, we have outreached to 175 shopping malls and premises. There are 66 that joined BFCI program and enlisted 62 Breastfeeding Friendly Star Premises that completed BFCI training. Among these, 12 premises were newly enlisted with existing breastfeeding rooms and 14 shopping malls has modified their breastfeeding rooms after joining the BFCI programme [G]. As

a future impact outcome, utilisation rate of shopping mall breastfeeding rooms linked to the app will be the next step based on funding.

Impact on individual breastfeeding mothers' self-efficacy and confidence

As of May 2021, our BFCI breastfeeding workshops delivered to 821 mothers and have helped 623 mothers significantly increase breastfeeding self-efficacy (BSES). Maternal breastfeeding self-efficacy is defined as a mother's perceived confidence in her ability to breastfeed her child, which influences her breastfeeding decisions and is significantly associated with a longer duration of breastfeeding [6]. Higher BSES scores indicate higher levels of breastfeeding self-efficacy and confidence [6]. As of May 2021, there was a significant 12% increase in mothers' breastfeeding self-efficacy after the workshop (Unpublished data, Grant 1).

Impact on breastfeeding promotion policy in Hong Kong

Our BFCI program [Grant 1][1-5] has been adopted by Family Health Service, Department of Health in Breastfeeding Friendly Community, and contributed on how to establish breastfeeding friendly premises as a video resource for the public [H]. As of May 2021, we distributed 5,283 promotional materials about the BFCI program and breastfeeding GPS app to 24 MCHCs and 8 HA hospitals with obstetric units. In which five HA hospitals and 24 MCHCs have adopted [I]. Our work [Grant 1][1-4] has aroused government interest. Specifically, the Committee on Promotion of Breastfeeding, that advise the Government on strategies and action plans to protect, promote and support breastfeeding in Hong Kong. It advises the government on measures to encourage different sectors in the community to put in place breastfeeding friendly facilities and measures (in which Lok were invited to share about the BFCI program/Breastfeeding GPS app) [J]. Expected impact after the completion of the project will be adoption of the BFCI program and update of breastfeeding app among Hong Kong population. There is a potential to extend the reach and translate the app into different languages and collaborate with other countries, especially in South Asia and Mainland China.

5. Sources to corroborate the impact (indicative maximum of 10 references)

- [A] Social Media Online Polling result. (Appendix 9)
- [B] Breastfeeding GPS app usage data. (Appendix 7)
- [C] Breastfeeding GPS Facebook page: https://www.facebook.com/bfGPS_hku_bfgps Instagram page: https://www.instagram.com/hku_bfgps/
- [D] Breastfeeding GPS Facebook geographical data on followers and reached and share (Appendix 6).
- [E] Evidence of Facebook data of Breastfeeding GPS video. (Appendix 17)
- [F] Evidence of Shopping mall video broadcast data. (Appendix 14)
- [G] Email confirmation of public premises of modified breastfeeding facilities (Appendix 8)
- [H] Family Health Service, Department of Health. Breastfeeding-Friendly Community. Establishing Breastfeeding Friendly Premises as a video resource for the public: <https://www.fhs.gov.hk/english/breastfeeding/community.html>
- [I] Pending Department of Health and Hospital Authority hospital letter of adoption. Email confirmation as evidence. (Appendix 11)
- [J] Invitation letter to The Seventh meeting on HKU-Baby Friendly Community Initiative Program in Hong Kong in the Committee on Promotion of Breastfeeding – Pending, email confirmation as evidence (Appendix 10 and 11)

To do list to follow up:

- i. Ratings and comments evaluation of the second phase of the breastfeeding app.
- ii. Qualitative interview of users experiences after 6 months to the launch of Phase 2 app.
- iii. Track progress of social media reach.
- iv. Track progress of shopping mall change to breastfeeding facilities.
- v. Utilisation rates of breastfeeding facilities linked with the app as a future KE project.

University: The University of Hong Kong (HKU)
Faculty: Faculty of Social Sciences
Title of case study: Improving Holistic Wellness Across the Lifespan in the Community through Expressive Arts: From Research To Practice
1. Summary of the impact (indicative maximum 100 words) Artistic expression plays an integral part in how we make sense of our world, to understand and communicate with others. In recent years, the value of arts in recovery from illnesses, injuries, difficult emotions, and promoting wellbeing has been well-recognized internationally. We have pioneered the application of the evidence-based Expressive Arts-based Intervention (EXABI) in wellness promotion, and prevention and management of clinical conditions in Hong Kong. The endeavour has shown promising health outcomes for individuals, healthcare providers, families, and the wider community, which in turn, help to promote the integration of the arts-based approach in mainstream professional and social services.
2. Underpinning research (indicative maximum 500 words) In Hong Kong, the research on the use of arts in the healthcare system is in its infancy phase. The CBH research team, under the leadership of Prof. Rainbow Ho, has integrated the model, developed outcome measures, and initiated more than 20 rigorous research studies on the use of various creative art forms since 2017. Research evidence indicated the potential of EXABI in improving physiological outcomes of stress (salivary cortisol), psychological conditions (stress, depression, loneliness, negative mood, self-esteem etc.), social and behavioral issues (agitation, prosocial behaviour, social support), as well as holistic wellness in general. Grounded in the results of these scientific inquiries, expressive arts significantly transform healthcare service delivery, development of culturally sensitive, evidence-based practices to the betterment of holistic wellness of the people of Hong Kong across the lifespan, especially in the domains of children with special education needs (SEN), the mental health of adults and older adults, as well as people with chronic medical conditions.
<u>Children with SEN & Caregivers</u> Play and arts-making are an integral part of fostering children's wellbeing, especially those who live with SEN. An embedded mixed-cohort, single-group experimental study of 213 primary school students with SEN indicated that children attending EXABI had reduced emotional difficulties, hyperactivity, and peer problems as perceived by both the parents and school teachers [R1]. Similar results were also found in another project with a controlled study on a “play-oriented” EXABI (134 parent-child dyads), indicating promising improvements in parents’ positive affect and children’s prosocial behaviours.
<u>Adults and Older Adults At Risk</u> EXABI also benefits the adults at risk of psychopathologies. A randomized-controlled trial (RCT) on 106 outpatient adults with major depressive disorders indicated that clay art intervention reduced depressive symptoms while improved mental health and holistic wellbeing [R2]. Furthermore, a RCT on older adults with mild dementia showed that dance movement intervention improved depressive symptoms, sense of loneliness, negative mood, and everyday stress response among elderly with mild dementia [R3].
<u>People with Chronic Clinical Conditions</u>

Existing support services for chronic clinical conditions focus primarily on skills training, whereas the importance of cultivating resilience and growth is secondary. The use of arts-as-intervention steps beyond this restricted view of wellbeing. In addition to our previous work on cancer, research conducted by our team shows evidence to support the potential benefits of arts in managing psychosocial wellbeing in chronic conditions, such as dementia, HIV, and intellectual disability (ID). A RCT of 73 elderly with moderate dementia showed that art-as-intervention might help manage behavioral and psychological symptoms, such as agitation, aberrant motor behavior, and dysphoria [R4]. In addition, a mixed-methods study on people living with HIV showed that art-making facilitated existential meaning-making, improved quality of life, and cultivated positive affect [R5]. Furthermore, a RCT of 109 Chinese adults with ID showed potential benefits of an arts-as-intervention program on fostering behavioral and emotional wellbeing [R6].

3. References to the research (indicative maximum of six references)

- R1. Fong, J.C.Y., & Ho, R.T.H. (2021). Examining the effectiveness of an arts-based empowerment programme for primary school students with and without special educational needs, paper presented at Society of Behavioral Medicine Virtual Conference.
- R2. Nan, J.K.M., & Ho, R.T.H. (2017). Effects of clay art therapy on adults outpatients with major depressive disorder: A randomized controlled trial. *Journal of Affective Disorders*, 27, 237-245.
- R3. Ho, R.T.H., Fong, T.C.T., Chan, W.C., Kwan, J.S.K., Chiu, P.K.C., Yau, J.C.Y., & Lam, L.C.W. (2018). Psychophysiological effects of Dance Movement Therapy and physical exercise on older adults with mild dementia: A randomized controlled trial. *Journal of Gerontology: Psychological Sciences*, 75(3), 560-570.
- R4. Ho, R.T.H., Fong, T.C.T., Sing, C.Y., Lee, P.H.T., Leung, A.B.K., Chung, K.S.M., & Kwok, J.K.L. (2019). Managing behavioral and psychological symptoms in Chinese elderly with dementia via group-based music intervention: A cluster randomized controlled trial. *Dementia*, 18(7-8), 2758-2798.
- R5. Kwong, M.K., Ho, R.T.H., & Huang, H.T. (2019). A creative pathway to a meaningful life: An existential expressive arts group therapy for people living with HIV in Hong Kong. *The Arts in Psychotherapy*, 93, 9-17.
- R6. Ho, R.T.H., Chan, C.K.P., Fong, T.C.T., Lee, P.J.Y., Lum, D.S.Y., & Suen, S.H. (2020). Effects of Expressive Arts-based Interventions on adults with intellectual disabilities: A stratified randomized controlled trial. *Frontiers in Psychology*, 11, 1286.

4. Details of the impact (indicative maximum 750 words)

The team has been supporting Hong Kong to develop a healthcare system that aligns with the vision of the World Health Organization (WHO) on the impacts of arts on health and wellbeing as an intersectoral action to improve wellbeing and health, reduce health vulnerabilities, strengthen public health through arts, and ensure healthcare services that are universal, equitable, inclusive, sustainable, and of high quality. Our team is also the pioneer in conducting scientific research in this area. The team's efforts in research, knowledge exchange, and active community engagement will help open up new frontiers for the community, healthcare service providers, and policymakers.

Expressive Arts as Evidence-based Intervention

The team has initiated different research projects to establish the arts-based intervention as an evidence-based practice in psycho-oncology, prevention of depression, children with SEN, dementia care, stroke rehabilitation of young adults, parenting and family wellness, and primary prevention of mood issues during the pandemic. These collaborations have allowed the synergy

of knowledge with **704 organizations** in the public sector, which ultimately served **69,632 beneficiaries** in 5 years.

Since 2013, Prof. Rainbow Ho and the team has published **32 journal articles, 9 book chapters, over 200 conference proceedings, and have delivered 27 keynote speeches** on arts as intervention. The knowledge accumulated contributes to establishing expressive arts as an evidence-based support practice in the future.

Expressive Arts as New Options for At-Risk Populations

Children with SEN: Our collaboration with the Sovereign Arts Foundation (SAF) has provided professional training and supervisions to **40** schools and agencies within the community. The 3-year program has served **10,664** direct beneficiaries including students, parents, teachers, and healthcare professionals, and **17,743** indirect beneficiaries from the general public [S1].

Adults with clinical conditions: Our ongoing collaboration with the Keswick Foundation has reached out to **250** elderly centres in Hong Kong and served **1,806** elderly with depressive symptoms, **798** healthcare professionals in the field, and **37,000** community members [S2]. Elderly adults who joined arts-based therapies were less depressed, more satisfied with their lives, and more positive towards their future. Local agencies were inspired by the team's work on dementia and adopted the use of expressive arts into their routine service [R3, R4].

Furthermore, the team's initiative in using expressive arts for substance abuse rehabilitation has been awarded the Beat Drug Fund in 2019. At present, the multi-component project has served **1,831** individuals from the non-academic sector [S3].

The team is also collaborating with **15** agencies, including public hospitals, patient resources centres, patient self-help groups, and community centres to provide EXABI to young stroke survivors; and has served **162** stroke survivors [S4].

Expressive Arts as Preventive Measure for Wellness Enhancement

The team has initiated a community-wide campaign to promote compassion in the community [S5, S6]. During the pandemic, with the support of the Robert H.N. Ho Family Foundation, the team launched an ambassador training program to encourage the use of arts to promote contemplative living and mental wellbeing in the general public [S7]. To date, the program has served **192** community-dwelling individuals.

Building Professional Community and Enriching Learning Experiences

The team has actively involved in the training of healthcare professionals. Over the past 5 years, based upon evidence-based knowledge and our practice experiences in using arts in interventions, we have organized several train-the-trainer projects, serving a total of **979** professionals and healthcare service providers.

Founded by Prof. Rainbow Ho, the Master of Expressive Arts Therapy program is the first of its kind in the region. For enriching students' learning experience, **575** agencies, including overseas agencies (e.g. in Shanghai, Fuzhou, Macau, Rome, and New York) have collaborated with the team to provide practicum and employment opportunities to our students, reflecting the impact of the team's advocate to integrate expressive arts in healthcare services. Up to now, the program has graduated **112** students, and have paved the way to their professional registration at renowned international professional bodies, including the International Expressive Arts Therapy Association (IEATA) and Association for Creative Arts Therapies in Australia, New Zealand and Asia (ANZACATA). Upon graduation, our graduates continue to inspire the community with their knowledge and participated in our community projects.

Impacting the Global Community in the Field through Research

The research works conducted by Prof. Rainbow Ho and the team have received international attention. Prof. Ho received international research awards and was invited to join the international research export group, and has delivered keynotes and lectures in the West, the Asia-Pacific region, Africa, and on virtual international meetings on topics related to arts and wellbeing [S8, S9, S10].

5. Sources to corroborate the impact (indicative maximum of 10 references)

- S1. Expressive Arts-based Intervention for Helping Community-Dwelling Depressed Elders. Keswick Foundation, HK\$2,803,938.7. 2017.5-2020.4.
- S2. Art-Essence: An arts-based empowerment programme for school children with special education needs and their teachers. Collaborative work with Sovereign Art Foundation; funded by the Hong Kong Jockey Club charity fund, HK\$2,110,000. 2017.7-2020.8.
<https://www.cbh.hku.hk/saf-virtual-presentation-photos>
- S3. From addiction to creation: Project on using creative arts for drug use prevention and young adult drug users empowerment (Project "CAPE"), HK\$2,619,778. 2019.6.1-2021.5.31
- S4. Chan C.K.P., Lo, T.L.T., Wan, A.H.Y., Leung, P.P.Y., Pang, M.Y.C., Ho, R.T.H. (2021). A randomized controlled trial of expressive arts-based intervention for young stroke survivors, *BMC Complementary Medicine and Therapies*, 21:7.
<https://doi.org/10.1186/s12906-020-03161-6>.
- S5. Potash, J. S., Ho, R.T.H., Ho, A.H.Y. (2018). Citizenship, Compassion, the Arts: People Living with Mental Illness Need a Caring Community. *Social Change*, 48(2), 238-259.
- S6. Ho, R.T.H., Potash, J.S., Ho, A.H.Y., Ho, V.F.L. & Chen, E.Y.H. (2017). Reducing Mental Illness Stigma and Fostering Empathic Citizenship: Community Arts Collaborative Approach. *Social Work in Mental Health*, 15(4), 469-485.
- S7. BMS Wellness Buddy (Ambassador Training) project. Robert H.N. Ho Foundation Limited. HK\$505,284. 2020.5-2021.4.
- S8. TEDx Talks (2017, June 23). Arts: It's all about Beauty, Abilities, and Endless Possibilities [Video]. YouTube. <https://www.youtube.com/watch?v=Fb1T7qiMdxs>.
- S9. "Dance for Wellness" Dance and global health, Hamwe Festival, University of Global Health Equity, Rwanda, Africa, 25-27 November 2019. <https://ughe.org/hamwe-2019/> and <https://mesh.tghn.org/articles/project-report-hamwe-festival-2019/>
- S10. Unlimited Possibilities of Arts for Holistic Well-being: From Artworks to Research Data. No Limits: Inclusiveness through the Arts 2021, Hong Kong Arts Festival.
<https://www.nolimits.hk/zh-hant/outreach/roundtable/>

University: The University of Hong Kong (HKU)
Faculty: Faculty of Education
Title of case study: Co-creating a New Normal of Empowered Learning through Digital Citizenship Research
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p><i>The Learning and Assessment for Digital Citizenship Project</i> funded by the RGC Theme-based Research Scheme started in November 2016, building on earlier related work in CITE. The Wave 1 study findings (data collected Dec 2018-Apr 2019) released in April 2020 revealed huge diversities in digital literacy achievement among primary and secondary students within and across schools. <i>eCitizen Education 360</i> was launched in May 2020 with wide support from the education sector, NGOs and charities as an action-focused comprehensive 360-degree survey study to guide evidence-based community-wide action to support the learning of students, families, schools and teachers under the New Normal.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p><i>The Learning and Assessment for Digital Citizenship</i> project (eCitizenship for short) is an interdisciplinary research project to study the impact of digital media on the learning lives of children and youth, and on their <i>development as citizens</i> in an increasingly technology-intensive and globally connected world. This multi-pronged study needs to address the grand challenges of developing valid and reliable assessments of digital citizenship (conceptualized as a critical human capacity, with digital literacy (DL) at its core), and innovative methodologies to understand how various contextual factors influences DL development.</p> <p>While prevalent theoretical models of DL are largely similar and multidimensional, our in-depth analysis of DL frameworks as well as empirical exploration on the dimensionality of DL through secondary analysis of DL assessment data of P5 and S2 students collected by CITE in 2007 in a contract research commissioned by the EDB (Reichert et al., 2020) show a general dimension of DL performance and four specific, tool-dependent dimensions, with important implications for DL assessment design. In developing a <i>Global Framework of Reference on Digital Literacy Skills</i> (Law et al., 2018) that can be equally applicable to developed and developing countries for the UNESCO Institute of Statistics, we find that the DL required to address similar problems can be vastly different depending on the technology infrastructure and the type of digital devices available in the particular setting. Based on these findings, we developed a set of DL assessment instruments for the eCitizenship main study involving DL assessment of three age cohorts of students: P3, S1 and S3 using an assessment design paradigm that differs fundamentally from prevalent models. The resulting instrument provides valid and reliable measures of DL across all three age cohorts on the same scale (Jin et al., 2020).</p> <p>Using the DL and survey instruments developed, the eCitizenship Wave 1 results show huge intra-school and interschool differences across students in terms of their DL performance, and nuanced connections with family background factors. School e-learning experience had minimal contribution to students' DL achievement. These findings, when released in April 2020, drew wide public attention due to its implications on students' abilities to engage effectively in online learning during the pandemic. With wide community support, the eCitizen Education 360 (e360 for short) was launched in May 2020 to research on the experiences and coping strategies of students, parents, teachers, and schools during the school suspension period. We adopted an ecological model that conceptualizes the experiences and outcomes for different stakeholders as dependent on pre-school-suspension conditions and their interactions. Constructs were developed to identify critical <i>online learning preparedness</i> factors. Data collection was conducted from mid-June to mid-July. E360 findings disseminated through press conferences, research bulletins and seminars provide holistic actionable recommendations for different stakeholders, including</p>

school leaders, teachers, parents NGOs and charities to work together in building a better New Normal. Recommendations address issues such as effective school e-learning team structures and strategies, teacher professional development priorities, and working with parents, and elaborated by project partners in community-based dissemination events.

3. References to the research (indicative maximum of six references)

1. Reichert, F., Zhang, D. J., Law, N. W., Wong, G. K., & de la Torre, J. (2020). Exploring the structure of digital literacy competence assessed using authentic software applications. *Educational Technology Research and Development*, 68(6), 2991-3013.
2. Jin, K. Y., Reichert, F., Cagasan, L. P., de la Torre, J., & Law, N. (2020). Measuring digital literacy across three age cohorts: Exploring test dimensionality and performance differences. *Computers & Education*, 157. doi:<https://doi.org/10.1016/j.compedu.2020.103968>
3. Liang, Q., Torre, J. D. L., & Law, N. (2021). Do Background Characteristics Matter in Children's Mastery of Digital Literacy? A Cognitive Diagnosis Model Analysis. *Computers in Human Behavior*, 106850.
4. Law, N., Woo, D., de la Torre, J., & Wong, G. K. W. (2018). *A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2*. Retrieved from Montreal, Quebec: <http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf>
5. Reichert, F., Lam, P., Loh, E.K.Y. & Law, N. (2020). *Hong Kong Students' Digital Citizenship Development. Initial Findings*. Hong Kong: The University of Hong Kong. . Retrieved from University of Hong Kong: <https://ecitizen.hk/timed/report/en>
6. Law, N., Tan, C. Y., Pan, Q. Q., Zhang, Y. X., Lan, M. & Lam, P. (2020-2021). *eCitizen Education 360 research bulletins*. Retrieved from Hong Kong: <https://ecitizen.hk/360>

Grants awarded to Nancy Law as Principal Coordinator/Investigator for the research

Project title:	<i>Learning and Assessment for Digital Citizenship</i>
Funding Scheme:	Research Grants Council of the HKSAR Government under the Theme-based Research Scheme (#T44-707/16N)
Funding Amount:	HK\$17,825,000 (Period: 2016-2022)
Project title:	<i>Developing a Global Competency Framework of Reference on Digital Literacy Skills for Indicator 4.4.2</i>
Funding Body:	UNESCO Institute of Statistics (contract research)
Funding Amount:	US\$45,000 (Period: 2017-2018)
Project title:	<i>eCitizen Education 360</i>
Funding Body:	Hong Kong Jockey Club Charities Trust
Funding Amount:	HK\$1,037,750.00 approved as funding designated to support the <i>eCitizen Education 360</i> project via the Jockey Club Self-directed Learning in STEM Programme (Project S/N Ref.: 2019-0061) in CITE. (Period: 2020-2021)

4. Details of the impact (indicative maximum 750 words)

Research on digital literacy assessment and the Wave 1 findings provide clear evidence that helped the public to:

- * recognize the multi-faceted nature of the student level digital divide, including DL competence, which is also connected with access at home to Internet-connected large screen devices, and for younger children, the opportunities to learn from/with other family members in the use of large-screen devices,
- * recognize the huge between school and within school digital divide, and that overall the contribution of school e-learning provisions to students' DL achievement was low,
- * be aware of the urgent need to take community-wide action to address the digital divide and enhance the online learning capacity of students, teachers and schools.

The findings were first disseminated through a widely publicized online press release, with support from the Faculty ER team and the HKU CPAO. Different stakeholder groups and charities reached out to eCitizen team to encourage us to undertake further research to provide evidence-based recommendation to guide learning and teaching under the New Normal. The e360 project Advisory Committee was launched within a month of the release of the Wave 1 research findings, which is truly remarkable. The pathway to impact during the e360 phase did not follow the conventional route of dissemination after the project ends. We engage stakeholders in the formulation of the research questions and instruments. The analysis and dissemination of findings was done in planned phases to provide evidence-based recommendations for action in order of urgency. Thus, the first e360 findings was released on 20.7.2020, on the overall status of online learning and particular weakness areas. This was followed by four reports on different aspects and dimensions of online teaching and learning preparedness: e-learning strategy, team structure and implementation at the school level (25.8.2020) status of and influencing factors on teachers' online teaching preparedness (3.11.2020), status of and factors on school level online teaching and learning leadership (19.1.2021), and parenting practices and the wellbeing of students at home and in school (30.3.2021). The Advisory Committee played a significant role in interpretation of the research findings and providing concrete examples for implementing the e360 project recommendations based on the research evidence, and disseminating them through territory-wide seminars.

Nature of impact and evidence include:

1. Charities took fast action to take action based on research evidence. Examples include:
 - a. Support from the Jockey Club Charities Trust to allocate HK\$1M+ for e360 to proceed.
 - b. Zonta Club of Hong Kong initiated the Project ABC (<https://zontahk.org.hk/projects-2020-2022/>) to help underprivileged families to cope with e-learning stresses during the COVID-19 pandemic. As reported on the Club's webpage (<https://zontahk.org.hk/project-2020-2022/>), *"The research study by Dr. Nancy Law forms the basis upon which our current advocacy and service project "Project ABC" was organized."* The project design was holistic, including a *Mothers Helping Mothers* component in addition to donations of laptops and Simcards.
2. NGOs involved with youth and family services took fast action to structure their services to target different stakeholder groups. Examples include:
 - a. In response to the e360 call for action, the Boys' & Girls' Club Association of Hong Kong (BGCA) launched a Community Digital Competence Hub to provide teachers and parents with learning resources, talks and activities to help them develop the necessary digital competence and to recognize and reduce the probability of falling victim to cyber-risks.
 - b. The Hong Kong Playgrounds Association (HKPA) reached out to school leaders and teachers through the e360 seminar series to promote its program on Youth at Cyber Risk Support Service. The extent of cyberbullying issues uncovered in the Wave 1 findings was otherwise not recognized by schools and helped HKPA to promote their service to schools.
3. Principals and senior teachers from primary and secondary schools that had high e-learning/online learning preparedness to address the COVID-19 induced school suspension shared their insight and experiences to illustrate how they could interpret and translate the recommendations from the e360 findings based on their own experience. Themes include:
 - The journey of schools in closing the digital divide in transition to the "New Normal"
 - How to form the school team to spearhead innovations and e-learning for teammates to move along?
 - Planning and implementing TPD that bring changes in teaching practice
 - Characteristics of progressive innovative teachers: insights for schools in the New Normal
 - School-based Professional Development – Building Trust, Collaboration and Innovation

4. The Wave 1 and e360 research attracted much attention in the local and international academic and professional communities. Numerous invitations to speak at high profile international and national conventions/webinars were received, e.g. Forum for World Education, World Education Frontiers Forum, HK Federation of Women at the UNCSW 65th session and education institutions such as National Institute of Education (NTU, Singapore).
5. Numerous reporting by local and international media on our research findings.

5. Sources to corroborate the impact (indicative maximum of 10 references)

1. Project ABC (<https://zontahk.org.hk/projects-2020-2022/>) launched by Zonta Club of Hong Kong. “The research study by Dr. Nancy Law forms the basis upon which our current advocacy and service project “Project ABC” was organized.” (<https://zontahk.org.hk/project-2020-2022/>).
2. Community Digital Competence Hub launched by The Boys’ & Girls’ Club Association of Hong Kong (BGCA). (https://360-cms.ecitizen.hk/uploads/04a_360_school_seminar_BGCA_7ec410b5f5.pdf)
3. Youth at Cyber Risk Support Service (<https://feel3.hkpa.hk/>) promoted by The Hong Kong Playgrounds Association (HKPA). (https://360-cms.ecitizen.hk/uploads/05_360_school_seminar_HKPA_83eb7264d0.pdf)
4. e360 advisory committee, principals and senior teachers from primary and secondary schools shared their insight and experiences at e360 seminars. (<https://ecitizen.hk/360/events>)
5. Invited talk on 透過行動為本的疫下研究激發多層次『傳染式學習』 at the 3rd World Education Frontiers Forum held on 21 Nov, 2020. (<https://mp.weixin.qq.com/s/UvjBAVHb6UGY3QN74GCWmg>)
6. Invited talk on “*Sparkling a multilevel learning epidemic through action-oriented research during COVID-19*” for the *New Education Normal Webinar Series* hosted by the National Institute of Education (NIE), Nanyang Technological University on 30 Nov 2020. (<https://www.nie.edu.sg/about-us/news-events/news/news-detail/new-education-normal-webinar-series-sparking-a-multilevel-learning-epidemic-through-action-oriented-research-during-covid-19>)
7. Invited talk on “*Expanding Science of Learning Research to Multilevel Aligned Learning: Studying online learning preparedness of students, teachers, school leaders and the community in HK during COVID19*” at the Forum for World Education: Lessons from How People Learn II: Opportunities and Imperatives for Education in a Post-COVID World on 26 Jan 2021. (<https://www.fweforum.org/event/fwe-webinar-lessons-on-how-people-learn-ii-opportunities-and-imperatives-for-education-in-a-post-covid-world>).
8. Invited presentation “*An Action-focused Community-based Study during COVID-19 for Equitable Quality Education for All*” at the UN Commission on the Status of Women (UNCSW) 65th session parallel event organized by the HK Federation of Women (HKFW) on 24 March 2021. Session theme was *Hong Kong Women in the Time of the Pandemic*.
9. OpenGov Asia (2020, July 21). *HKU study calls for more measures to enhance e-learning preparedness*. <https://opengovasia.com/hku-study-calls-for-more-measures-to-enhance-e-learning-preparedness/>
10. Local and International media coverage on e360 research findings: <https://www.ecitizen.hk/360/media-coverage>

Annex II

Quantitative Indicators

Table 1

Performance Indicators Laid Down by UGC	2021/22
Number of patents filed in the year (with breakdown by country and type) ^{Note 1}	270 ^{Note 2}
Number of patents granted in the year (with breakdown by country and type) ^{Note 1}	80 ^{Note 3}
Number of licenses granted (with breakdown by type) ^{Note 1}	142
Income (on cash basis) generated from intellectual property rights	\$34.61M
Expenditure involved in generating income from intellectual property rights ^{Note 4}	\$11.2M
Number of economically active spin-off companies (with breakdown by type) ^{Notes 1 & 5}	41
Net income generated (or net loss arising) from spin-off companies ^{Note 6}	(\$9.4M)
Number of collaborative researches, and income thereby generated ^{Note 7} - no. of projects - income generated	46 \$74.01M
Number of contract researches (other than those included in "collaborative researches" above), and income thereby generated ^{Note 8} - no. of projects - income generated	1030 \$575.27M
Number of consultancies, and income thereby generated ^{Note 9} - no. of projects - income generated	982 \$92.34M

Performance Indicators Laid Down by UGC	2021/22
Total of collaborative researches, contract researches and consultancies ^{Note 10} - no. of projects - income generated	2058 \$741.62M
Number of student contact hours in short courses or e-learning programmes specially tailored to meet business or continuing professional development (CPD) needs	3,842,912 Note 11
Income received from CPD courses ^{Notes 12}	\$889M Note 11
Number of equipment and facilities service agreements, and income thereby generated - no. of agreements - income generated	64 \$8.2M
Number of public lectures/symposiums and speeches to a community audience ^{Note 13}	1,913
Number of performances and exhibitions of creative works by staff or students ^{Note 13}	86
Total of public lectures/symposiums/speeches to a community audience and performances and exhibitions	1,999
Number of staff engaged as members of external advisory bodies including professional, industry, government, statutory or non-statutory bodies	467

(Data as of early July)

Notes:

1. The number of patents granted is unrelated to the number of applications in a particular year.
2. The number of inventions involved is 203 (this is the updated 2021-22 figure).
3. The number of inventions involved is 62 (this is the updated 2021-22 figure).
4. The costs incurred in protecting all IPR in the reporting year are reported, without limiting only to those patents that were successful in generating income.
5. For commercialisation, the University through Versitech takes a dual approach of spin-off and licensing. In addition to spin-off companies, start-ups that are commercialising HKU technologies and funded by the Technology Start-up Support Scheme for Universities at HKU (TSSSU@HKU) have been included.
6. Versitech, HKU's wholly owned technology transfer company, is a minority shareholder in the spin-off companies. It is difficult to predict the companies' sales/turnover due to the volatile business environment. Only the net income (or net loss) of those companies with equity held by Versitech was reported because being the equity holder Versitech could obtain the financial information from those companies.
7. ITF projects with industrial sponsorship and other collaborative projects with at least two partners (one of which being a government or public body) were included.
8. Contract research projects commissioned by external organizations, and projects supported by funding schemes that allow non-higher education institutions to apply, including ITF projects without industrial sponsorship, Public Policy Research projects, and projects funded by the Food and Health Bureau, the SK Yee Foundation, Construction Industry Council, and Standing Committee on Language Education and Research (SCOLAR), were included. NIH projects have been classified as Contract Research since 2016/17.
9. Consultancy and service projects for KE commissioned by external organizations to the University or Versitech, and consultancies undertaken by individual staff as outside practice (excluding clinical service and teaching in other tertiary education institutes) were included.
10. It is considered more appropriate to group collaborative researches, contract researches and consultancies together because it is sometimes not easy to classify projects into these categories.
11. The number of CPD courses and income thereby generated do not include self-funded Ug/TPg programmes and programmes offered by HKU School of Professional and Continuing Education (HKUSPACE) because the data are not yet available at the time of KT Report submission. However, the HKUSPACE data will be included in the UGC's Common Data Collection Format (CDCF) submission.
12. Net income was provided.
13. Community, cultural and KE-related events organised by the University and those delivered by academic staff at the invitation of external organisations were included.

Table 2

Other Performance Indicators of HKU	2021/22
Number of postgraduate theses on open access ^{Note 1}	29,875
Download count of postgraduate theses to addresses outside HKU ^{Note 1}	167,392
Number of publications on open access ^{Note 1}	34,707
Download count of publications to addresses outside HKU ^{Note 1}	1,227,612
View count of HKU Researcher Pages from outside HKU ^{Note 1}	5,107,916
Number of placement/internships ^{Note 2}	7,190 ^{Note 3}
Number of appointments of external members to HKU advisory boards, committees or panels ^{Note 2}	595

(Data as of early July)

Notes:

1. These five indicators refer to the University's efforts in making knowledge accessible to society.
2. As HKU sees KE as a two-way process, these two indicators refer to the University's efforts to learn from the community.
3. There is drop in 2021/22 due to the fifth wave of COVID-19 pandemic.

July 31, 2022