香港教育大學
The Education University of Hong Kong

ANNUAL REPORT ON RECURRENT FUNDING FOR KNOWLEDGE TRANSFER 2022/23

KNOWLEDGE TRANSFER SUB-OFFICE
知識轉移辦公室

Submitted to University Grants Committee

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1. EXECUTIVE SUMMARY

Knowledge transfer has become increasingly crucial as university scholars and researchers seek to maximise their research and innovation impact and contribute to Hong Kong's socioeconomic development. Local universities have increased their efforts in implementing various new initiatives to promote knowledge transfer through enhancing knowledge transfer activities within universities, setting up incubators and accelerators, partnering with industry and government, etc. To facilitate the commercialisation of research outcomes, EdUHK actively works towards sharing our knowledge and expertise with external organisations and the wider community, hoping to translate our multi-disciplinary research into practical solutions benefiting society.

With the alleviation of COVID-19 and lifting all local social distancing measures, we continue developing research and intellectual property (IP) with social and commercial values and fostering entrepreneurial activities and incubation schemes for young start-up leaders. A total of 18 Hong Kong Short Term, China invention and US invention patents were filed, and 9 were granted with our active participation in invention generation. Two of the IPs are derived from Gold Medal award-winning inventions about strabismus assessment and microplastic quantification, and others built their foundation on translational projects from different areas, such as language learning, digital and performing arts, electronic engineering, and more.

EdUHK also received international recognition for our innovations at international exhibitions in Canada, Geneva and Taiwan. With the combined efforts of our researchers and start-ups, EdUHK acquired 39 awards and brought 17 innovations to the global stage. The winning inventions cover environmental sensing and green technology, healthcare, arts and music education, and so on.

Since its establishment, the Knowledge Transfer Sub-Office (KT Sub-office) of the University has been dedicating time and resources, internal and external, to provide holistic support to EdUHK academics and research units, helping to develop their research and create a tangible, long-lasting impact that benefits the broader community. On top of improving the three existing funding schemes, we started a new initiative to support academics in their grant application process and supported translational KT and research projects that promote innovation development. As for entrepreneurship development at EdUHK, 10 out of the 39 trained start-up teams received sizeable funding and acquired 10 external awards and recognitions.

This report summarises EdUHK's key KT and entrepreneurship activities, achievements and development in the 2022–23 academic year.

2. HIGHLIGHTS OF THE YEAR

With the University Grants Committee's (UGC) support through the Earmarked Research Grants, EdUHK advances the promotion of knowledge transfer and research and addresses the challenges faced by the industry, education sector and society in Hong Kong and beyond. The University's continuing implementation of the Education-plus approach provides the bedrock for EdUHK's innovations and achievements, directing researchers' creative endeavours to areas like EdTech for language, music, sports and special education; AI and the metaverse; and green and health technologies. To push forward our impact-driven interdisciplinary research, different pursuits are made in place to enlarge the innovation and technology (I&T) capabilities of the University, such as establishing strategic industry partnerships, accelerating the growth of our incubator programmes, linking EdUHK researchers with external professionals for collaboration opportunities, as well as acquiring grants and funding.

2.1 DRIVING INNOVATION

2.1.1 KNOWLEDGE TRANSFER SUB-OFFICE

Bridging between the University and the broader community in education and related areas, the KT Sub-office of the Research and Development Office facilitates KT by supporting the two-way flow of academic and professional knowledge, ideas, techniques, and expertise. As the third pillar in university development besides teaching and research, the KT Sub-office strives to develop the intellectual capacity and capital in the University's research and teaching activities to link more closely to KT and serve socio-economic development needs locally, regionally and globally.

Through collective efforts from the four teams "Entrepreneurship Development", "IP Development", "IP Promotion and Licensing", and "Quality Assurance", the KT Sub-office continuously provides comprehensive assistance to researchers at EdUHK for translational research implementation and propels technology development and adoption by forging stronger collaborations and partnerships with industries involving high-end consultancy, contract research and IP licensing. A series of entrepreneurial activities have also been introduced to start-up enthusiasts among the student community to develop and enhance their potential into social ventures with a long-lasting impact.

2.1.2 FUNDING SCHEMES

The KT Sub-office has been fully utilising internal and external resources in closing the gap between research and practical applications by setting up the funding infrastructure to support KT initiatives within the University. Various internal funding schemes are distributed among EdUHK researchers to strengthen their translational research and develop novel research outcomes with market potential.

2.1.2.1 KT FUND

Aligning with the University's incentives, the annual KT Fund Scheme continues to support EdUHK researchers in creating EdUHK-owned IPs and implementing activities or initiatives for KT. Eight funded projects within the reporting period are listed in Annex II. The scheme is set to proceed in the 2023–24 academic year with an extensive review scheduled to enhance the extent and coverage to align with the University's latest strategies and societal demands.

2.1.2.2 ITECH FUND

To support I&T advancement, the iTech Fund provides EdUHK academic/teaching staff funds to produce technological models, prototypes and demonstrations from their research ideas and results. One of the projects supported is on HealthTech, improving the accuracy of predicting the cognitive and emotional process during learning for children with Autism Spectrum Disorder. Another funded project focuses on performance arts, integrating cutting-edge technology with traditional puppetry, one of Hong Kong's Intangible Cultural Heritage. A total of 5 projects are supported (listed in Annex III) out of 13 applications.

2.1.2.3 FUND FOR INNOVATION, TECHNOLOGY, AND SOCIAL-WELLBEING

With the support from the HKSAR Social Innovation and Entrepreneurship Development Fund (SIE Fund), four social innovation projects backed by applied research in education, public health, art and culture, and social reconstruction from the first cohort of the Fund for Innovation, Technology, and Social-wellbeing (FITS) scheme are funded to identify social issues and develop sustainable solutions that tackle poverty and foster well-being and social cohesion. Project teams collaborate with commercialisation partners from industries and the community to fill the gap between proof of concept and sustainable, practical initiatives addressing societal needs and opportunities.

2.1.2.4 KNOWLEDGE TRANSFER MATCHING GRANT SCHEME

The KT Sub-office will launch the Knowledge Transfer Matching Grant Scheme (KTMGS), a new initiative to incentivise EdUHK researchers to secure external grants for I&T. Starting in 2023–24, HK$600,000 will be fundable annually to foster a more robust and active I&T development culture within the University. The introduction of this programme has been met with enthusiasm, and researchers in various academic fields (e.g. natural language processing, machine learning, digital literacy, etc.) have indicated their interest in applying for grant matching.

2.1.3 INTELLECTUAL PROPERTY (IP)

2.1.3.1 INNOVATION LICENSING

In line with the "Education-plus" approach, where the impact of research and development goes beyond conventional teaching and learning, the University's KT efforts are focused on humanities, social sciences, creative arts and culture, environmental studies, mathematics and statistics, neuroscience, and computer science. In the 2022–23 academic year, EdUHK granted 5 active licenses to commercialise EdUHK IPs to educational business entities. These licenses range from performance arts innovations, healthcare technology, educational technology solutions, etc. Two of our licensees Stardust Hall Limited and KreativeLab HK Limited are EdUHK's start-ups where the founders are our research students.

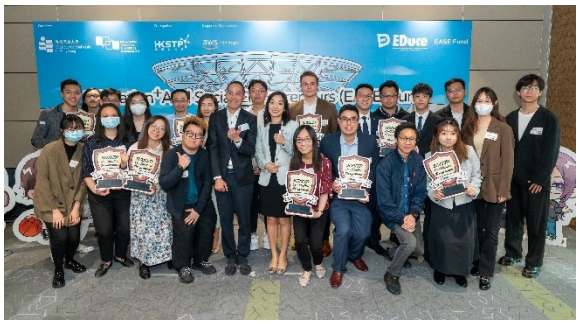
2.1.3.2 PATENTS

To support patent applications for inventions from EdUHK staff, the KT Sub-office has set up a central fund since 2018 to encourage our academics and researchers to protect their intellectual work through patent registration. Patenting is a legal method of safeguarding EdUHK's inventions and capitalising on the university's knowledge transfer to the community through licensing. Rounds of refinements were undergone to streamline the patent application process, and we have then introduced comprehensive patent consultation services and processed 19 patent applications. Patents filed and granted in the reporting year can be found in Annex V.

2.2 FOSTERING ENTREPRENEURSHIP

Besides technology transfer, the Entrepreneurship Development Unit (EDuce) of EdUHK KT Sub-office provides comprehensive support to innovators in their entrepreneurial journey to commercialise their start-up and research ideas into sustainable enterprises. EDuce envisions building a dynamic entrepreneurial environment within EdUHK with strategic stakeholders from Hong Kong and worldwide.

2.2.1 EDUHK SEED FUNDING PROGRAMME – EDUCATION+ AND SOCIAL ENTREPRENEURS (EASE) FUND SCHEME



Formerly known as the *EdUHK Education And Social Entrepreneurs Fund*, the rebranded EASE Fund Scheme supported by the Home and Youth Affairs Bureau launched in October 2022, refining the venture development ecosystem in academia while providing seed funding and resources to a broader scope of students and alumni in pursuit of becoming entrepreneurs. 39 teams underwent months of training to train their entrepreneurial mindset and improve the market-readiness of their solutions in the screening and pitching rounds, with 10 qualified for the final pitching in March 2023. With EdUHK's first collaboration with HKSTP on the "Co-Ideation Programme", final teams were awarded a total of HK$2 million in entrepreneurial support, covering seed capital, professional guidance, training and resources to realise their start-up dreams in EdTech, mental health, arts and culture, environmental sustainability and social services. To nurture the winning EASE Fund start-up teams, the 10 selected teams will base at the Hong Kong Science Park and proceed to grow their business ideas with pitching and investment training and entrepreneurial mentoring and advice.

2.2.2 EDUHK SEED FUNDING PROGRAMME – FUNDING SCHEME FOR YOUTH ENTREPRENEURSHIP IN GUANGDONG-HONG KONG-MACAO GREATER BAY AREA

The KT Sub-office continues to be supported by the HKSAR Home and Youth Affairs Bureau Youth Development Fund (YDF) to offer entrepreneurial support and incubation services with over HK$11 million funding. Government officials, stakeholders in the entrepreneurship ecosystem, industry leaders as well as the EdUHK entrepreneurial community gathered during the Grand Kick-off Ceremony and Showcase in December 2022 to create synergy and forge meaningful connections for future partnerships. With the funding scheme, seed funding, partnerships with entrepreneurial bases and 120+ hours of entrepreneurship workshops are incorporated to enhance the EASE Fund.

2.2.3 EDUHK CENTRE FOR ENTREPRENEURSHIP AND RESEARCH (CEAR)

The Centre for Entrepreneurship and Research (CEAR) initiated in the last reporting year continues to empower EdUHK faculty members by offering incubation and collaboration resources and connecting innovators with like-minded entrepreneurs and early-stage start-ups. By incubating EdUHK projects to impactful science and technology businesses, the transfer of research knowledge, acceleration of technological innovation and commercialisation benefit social development.

The 1st Cohort CEAR Teams comprised of 3 EdUHK R&D teams had been admitted and funded for technology capability enhancement, including Resolver Lab, Innovative Music Zentre and LearnToEarn headed by Dr FU Hong, Dr LEUNG Chi Hin Michael and Dr TING Sze Thou Fridolin, respectively. The KT Sub-office completed the tenancy due diligence and is in the leasing process of establishing a workspace at the Hong Kong Science and Technology Parks Corporation (HKSTP) to provide CEAR Teams a multi-facet environment to generate disruptive innovations in areas of business, research, science and technology.

2.2.4 INNOVATION AND ENTREPRENEURSHIP STUDENT TALENT DEVELOPMENT (INVESTED) PROGRAMME & ASIAN UNIVERSITIES STUDENT ENTREPRENEURSHIP IDEATION CHALLENGE (AUSEIC)

The INVESTED Programme is a one-year non-credit-bearing course equipping EdUHK undergraduate and postgraduate students with the skillsets, knowledge and hands-on experience to become innovators and entrepreneurs. After going through workshops, talks and boot camps, students get internship opportunities and form teams to compete in two local and regional entrepreneurship competitions, one of which is the Asian Universities Student Entrepreneurship Ideation Challenge (AUSEIC).

Jointly organised by EdUHK, East China Normal University, Singapore Nanyang Technological University National Institute of Education and Universiti Kebangsaan Malaysia, AUSEIC is an interdisciplinary and interinstitutional innovation and entrepreneurship development programme that provides a platform for student contribution to the education industry development worldwide and encourages student development of innovative ideas relating to the United Nations' Sustainable Development Goal 4. Bridge Neuro from EdUHK won the Champion in the final pitch among 12 finalist teams comprising over 70 participants from the 4 participating Asian universities.

2.2.5 EDUHK INCUBATED START-UP ACHIEVEMENTS IN EXTERNAL COMPETITIONS

Besides providing opportunities for start-ups to grow, the KT Sub-office also supports start-up teams with consultation and training services for their local and international competition preparations, enabling start-ups at EdUHK to access further funding and business opportunities through potential investors, partners and customers in experiential learning. Highlighted external recognitions are set out in Annex IX.

2.2.6 COLLABORATIONS WITH MAJOR STAKEHOLDERS IN THE INCUBATION ECOSYSTEM

To promote I&T development culture within the University, EdUHK has collaborated with HKSTP and Cyberport on various occasions as follows:

i. HKSTP Hong Kong Techathon 2023
ii. HKSTP Co-ideation Programme 2022–23
iii. Cyberport University Partnership Programmes (CUPP) 2023
iv. HKSTP Openhouse 2022 (Promotion and Participation)
v. HKSTP TECH TALK --- Cultivating a purpose-driven culture (Promotion)
vi. Cyberport Greater Bay Area Young Entrepreneurship Programme (GBA YEP) 2022–23 (Promotion)

42 EdUHK students and alumni joined the Hong Kong Techathon 2023, a one-week entrepreneurship challenge to develop technological ideas and prototypes and pitch for seed funding and incubation support comprising over 960 participants.

Start-up teams “CATSAPP” and “EdQuo” participated in the FinTech-themed bootcamp at the University of Cambridge, Judge Business School through CUPP 2023 supported by Cyberport Creative Micro Fund (CCMF) and co-organized by EdUHK with other local universities. The 6-month FinTech experience also includes pre-camp nurturing sessions, mentorship and insights from glocal FinTech industry elites, investment pitching to investors, and a potential CCMF grant of HK$100,000 to work towards incubation and venture.

2.2.7 TEACHER ENTREPRENEURIALISM SERIES

Teacher entrepreneurialism is a growing sub-field in teacher leadership and school improvement that has become a core focus of the Department of Education Policy and Leadership over recent years. School-based teacher entrepreneurialism training programmes were scaled up to become the *Cross School Entrepreneurial Teacher Leaders* programme in the past two years, drawing on EdUHK’s research and seed opportunities and informing the development of new courses. The programme reached a total of nearly 3,000 principals, senior teachers and teachers, forging strong partnerships with collaborating schools from 300 schools and building teacher and school leadership in the current local and global context of education.

2.3 MAKING DIFFERENCES

2.3.1 CREATING IMPACT ON INDUSTRY & SOCIETY

Leveraging the results of EdUHK’s fundamental research to have notable impact on lifelong learning and the advancement of I&T, we maximise the value of our work through partnerships with external parties. The ensuing achievements serve as a few of our most noteworthy highlights.

2.3.1.1 KT PARTNERSHIP WITH A FURNITURE MANUFACTURER

The KT Sub-office established a strategic partnership with a branch of a sizeable Hong Kong furniture manufacturer with 30+ years of experience in furniture OEM for luxury brands in developing original research-based furniture with specific educational, training, and/or rehabilitation features for the local market. With complimentary furniture design refinement and prototype production services, we aim to apply the proposed innovative furniture backed with research in learning environments, nursing homes, community centres, or other appropriate.

2.3.1.2 EDUCATIONAL INNOVATION LEADERSHIP PROJECT (EDILP)

In its 4th year of running, the EdILP integrates EdUHK's academic theories and knowledge with successful field experiences of local schools in facilitating their innovative educational development through in-depth collaboration programmes. With different programmes to support and enhance school development, such as the Quality Education Development Holistic Support Programme, the Project benefits more than 7,700 teachers, principals, school managers and other relevant stakeholders from secondary, primary and kindergarten school sectors.

2.3.1.3 ONE CITY ONE BOOK 2022

One City One Book Hong Kong (我城我書) 2022 is a community reading programme that promotes literature, reading, and civic engagement by encouraging as many people as possible to read and discuss the bilingual poem selection "Moving a Stone" composed by the local writer Yam Gong together. The EdUHK International Research Centre for Cultural Studies collaborated with the Hong Kong International Literary Festival and many others across a series of 29 events reaching diverse audiences, with more than 11,000 people stopping by the month-long concluding exhibit in Kwun Tong.

2.3.1.4 SCREENING FOR MILD COGNITIVE IMPAIRMENT, DEMENTIA, AND HEARING LOSS IN OLDER ADULTS IN THE COMMUNITY WITH SPECIAL AUTOMATED AUDIOLOGICAL ASSESSMENTS

The team from the Department of Special Education and Counselling is conducting a two-year project to develop and implement a cost-effective automated screening test for the elderly in the community. As of 30 June 2023, more than 130 elders received the direct screening service, and public awareness of hearing health and cognitive decline has been raised in the nearby community, reaching 500+ stakeholders. Hearing and/or cognitive problems detected in the services were referred for professional follow-up, substantially delaying or even preventing dementia onset due to the association between hearing loss and cognitive decline, and increasing the timeliness of healthcare intervention.

2.3.2 DISSEMINATING RESEARCH OUTPUTS

University staff are encouraged to collaborate with external organisations to strengthen EdUHK's research and KT efforts. As part of their professional responsibilities, academic and teaching staff members may engage in research and knowledge transfer projects financed by external entities via tenders, contract research, and consultancy.

2.3.2.1 TENDERS/CONTRACT RESEARCH AND CONSULTANCIES

The KT Sub-office supported 148 contract and collaborative research and consultancy projects worth nearly HK$157.7 million in the 2022–23 academic year.

2.3.2.2 EDUHK RESEARCH REPOSITORY

The EdUHK Research Repository (https://repository.eduhk.hk) is the centralised digital location of the University's research outputs made by EdUHK staff and postgraduates, which includes 42,399 validated records of citations and materials such as scholarly books, book chapters, journal articles, conference papers, TDG reports, and more as of 30 June 2023. 309,675 visits were recorded between July 2022 to June 2023 from different continents. With the increased visibility of the University's research outputs readily available on the Internet, the Repository directly transfers the knowledge, efforts and results of EdUHK's research to the general public.

2.3.3 TRAINING PROFESSIONALS

With continuous commitment to improving our research capabilities and outputs, EdUHK disseminates and transfers new knowledge to professionals every year by upgrading the training of educators and practitioners, producing new cohorts of professionals that possess cutting-edge research-based knowledge.

2.3.3.1 CONTINUING PROFESSIONAL DEVELOPMENT (CPD) COURSES

In partnership with external organisations on occasion, EdUHK departments and centres have been offering diverse self-funded professional development courses and training programmes to support the ongoing education development in early childhood, primary, secondary, technical and special education by disseminating the latest teaching methods and research findings. CPD courses provide opportunities to establish close relationships and networks between EdUHK and schools, thus significantly advancing innovations in the school sector and developing highly skilled education practitioners.

Training Education Experts for Employment
Co-organised with the South China "New Normal" Construction Steering Committee, a new initiative by the Asia Pacific Centre for Leadership and Change "Summer Institute for Teacher Leaders from GBA Normal Universities" (26–30 June 2023) enriched pre-service teachers' professional learning and promoted educational and cultural exchanges across the GBA. Speakers and scholar-practitioners in the HK education profession shared their insights from different sectors of the educational system to deepen participants' understanding of internationally leading educational experiences and enhance their professional responsibility. Other than the national level, training and certificate programmes, e.g. "Advanced Certificate in Benchmarks for Career and Life Development Education" and "One Professional Development Programme (PDP)" series, are held in Hong Kong and Macau.

Leadership Training for School Management
The "Needs Analysis and Preparation for Principalship Course for Aspiring Principals", "Programme of Leadership Enhancement for Serving Vice Principals" and "Professional Vision and Growth of School Leaders" are leadership programmes accredited or commissioned by the Education Bureau designed for school leaders to achieve their professional leadership potential, enhance their effectiveness and widen their perspectives on national and international education trends, opportunities and challenges.

Moreover, the University also have numerous CPD courses on offer, improving education competency in areas like robotics, data analytics, curriculum leadership and management, with more than 1,500 principals and 26,150 teachers utilising the courses.

2.3.3.2 THE 3RD INTERNATIONAL KNOWLEDGE TRANSFER FORUM

This year marks the 3rd consecutive year that the Department of English Language Education and the Association for the Teaching of English as a Foreign Language (TEFLIN) in Indonesia co-organised the International Knowledge Transfer Forum. Experienced Second Language Acquisition researchers conducted four online sessions in August and September 2022 to improve Indonesian English teachers' digital storytelling and literacy skills. Over 1,400 educators with diverse teaching experiences attended through Zoom and YouTube live streams or watched the recorded sessions, discussing digital literacies, integrating digital storytelling into teaching practices and sharing personal teaching experiences. The Forum strengthens EdUHK's connections with researchers and educators abroad and provides a platform for mutually beneficial exchange between research and practice.

2.3.4 STUDENT ENGAGEMENT

2.3.4.1 STUDENT INTERNSHIPS AND PLACEMENTS

Our Student Affairs Office and Faculties organise student internship programmes to diversify EdUHK students' learning opportunities and develop their job capabilities in different careers, such as teaching, I&T, commercial, NGO, government, etc., in Hong Kong and abroad. Student placements and internship opportunities broaden students' exposure to various sectors and transfer knowledge to and from the community.

2.3.4.2 ENTREPRENEURIAL EDUCATION AND SOCIAL INNOVATION CULTURE

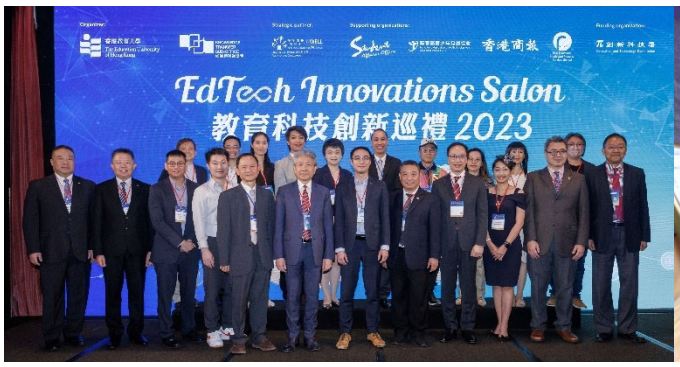
The EdUHK Entrepreneurship and Innovation Education Unit (EIEU) under the library nurtures the E&I culture within the student community by expanding their potential in applying and transferring entrepreneurial skills in education and other professions.

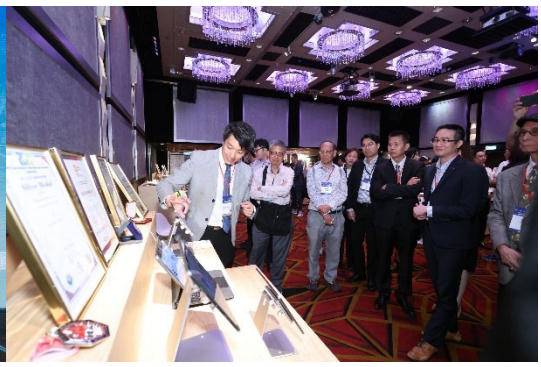
EdU Autumn Mini Fair & 2023 Student Fair - EdUHK Lunar New Year Fair
The "EdU Autumn Mini Fair" (17–18 September 2022) and "2023 Student Fair - EdUHK Lunar New Year Fair" (14–15 January 2023) are platforms that offer hands-on experience in entrepreneurship and innovation to EdUHK students, alumni and local schools. More than 40 physical stalls at each event were set up at Central Market and PMQ respectively, allowing participants to put what they learnt from business planning, product sourcing and development, marketing management, etc. into practice.

"Think & Design" Product Design Competition
Jointly organised by the EIEU, Centre for Learning, Teaching and Technology, and School Partnership and Field Experience Office, the "Think & Design" Product Design Competition aims to inspire Hong Kong students with STEM skills and nourish their entrepreneurial and innovative skills. EdUHK students serve as EI Leaders in leading the participating School Teams to design and prototype physical products and digital solutions. 30 teams went through 4 months of training and workshops on entrepreneurship, with the top 8 teams from each division entering the Final Pitching in late November 2022. Selected winning products from the competition were showcased at the Learning and Teaching Expo on 7-9 December 2022 at the Hong Kong Convention and Exhibition Centre (HKCEC).

2.4 EMPOWERING KT MARKETING

2.4.1 EDTECH INNOVATIONS SALON 2023





To share the most-updated educational technology (EdTech) innovations and create more collaborations among academia, educators and industry, the KT Sub-office gained the support of the HKSAR Innovation and Technology Commission (ITC) to highlight a total of 23 latest EdTech and

innovations developed by the University and our partners at the EdTech Innovations Salon 2023 (13 June 2023). Over 400 educators, industry experts, government representatives and other professionals engaged in a full day of interactive forums, discussing and exchanging ideas on the latest EdTech trends while co-creating a sustainable EdTech ecosystem in Hong Kong. The Salon also featured networking opportunities and 15 award-winning projects from international invention exhibitions at the exhibition hall. The event enhances attendees' knowledge and understanding towards EdTech and various aspects of the learning and teaching experience, and encourages practitioners in the field to continue working towards a more conducive learning environment for generations to come.

2.4.2 AUTM 2023 ANNUAL MEETING

AUTM members around the globe representing 800+ universities, research centres, businesses, government organisations, etc. from 60 countries convened at the 2023 Annual Meeting in Austin, Texas, USA (19–22 February 2023) for commercialisation opportunities, meeting technology transfer professionals and discovering industry developments. EdUHK's exhibits on showcase were greatly received by members in attendance in terms of the problem/solution fit, product uniqueness and social impact of our inventions.

2.4.3 INNOCARNIVAL 2022

The KT Sub-office joined the annual HKSAR ITC InnoTech Month flagship event InnoCarnival 2022 (22–30 October 2022). To develop and pass on traditional Chinese culture, the EdUHK booth themed "New Presentation of Chinese Culture" displayed innovative projects related to Cantonese Opera, Chinese poetry, and moral values. With the active exploration of multi-field collaborations by EdUHK research teams, modern technology is incorporated into daily lives, promoting new findings and innovations to the community.

2.4.4 HONG KONG INTERNATIONAL MEDICAL AND HEALTHCARE FAIR 2022

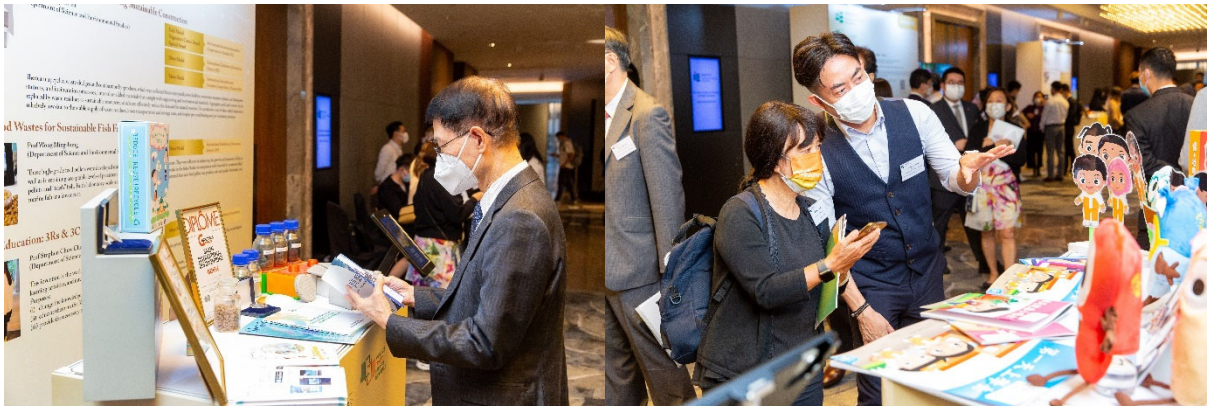
Four projects related to physical and mental well-being were on display at the HKCEC (9–11 November 2022). KT Sub-office set up a booth to feature the ready-for-market solutions developed by our researchers: the Audio-Tactile Chinese Characters and Portable Interactive & Meditative Mirror by Dr HUNG Keung, Lighten Dementia Game Set by one of our social venture start-ups, and Sitting Light Volleyball – A Garment for Sports or Activities by Dr LEUNG Ka Man.

2.4.5 EDTECH SHARING

Two EdTech Sharing sessions were held on 10 October 2022 and 6 January 2023, attracting about 80 attendees with the topics "Metaverse and Robot for Smart Training" and "EdTech Sharing × AI". Founding members of LeoLuca Limited and HandyRehab introduced their metaverse concept and stroke rehabilitation technology, shedding light on the effects of EdTech in Web3 virtual spaces and healthcare, while founders of Fan{task}tic AI and DeepTranslate Limited shared their experiences in entrepreneurship and demonstrated their technology and potential in education applications. The sessions enabled EdUHK students and staff to connect with external partners in EdTech and explore future collaboration opportunities with the companies.

2.4.6 THE EDUHK FOUNDATION THANKSGIVING RECEPTION

Hosted by the Alumni Affairs and Development Office with utmost gratitude for the University donors' full support in the preceding years, KT Sub-office exhibited the highlighted EdUHK innovations at the EdUHK Foundation Thanksgiving Reception (24 October 2022) to cultivate future donor-University collaborations.

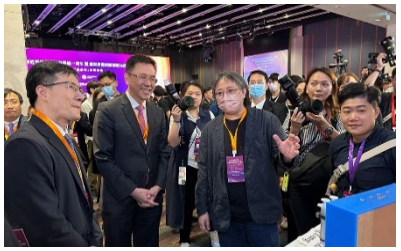


2.5 INTERNATIONAL INVENTION AWARDS AND ACHIEVEMENTS

In hopes of bringing about societal improvement and economic transformation, EdUHK has been transforming research knowledge into practical applications that are acknowledged globally. Every year, KT Sub-office presents technological innovations and discoveries of our University researchers and start-ups at various international competitions and exhibitions and within the professional community. 17 projects showcased at the events in 2022–23 captured 39 international invention awards set out in Annex X. The winning innovations cover different application areas, such as green technology, healthcare, educational technology, food safety, acoustic novelty, metaverse and sport innovation.

2.5.1 INTERNATIONAL EXHIBITION OF INVENTIONS GENEVA

The 48th International Exhibition of Inventions Geneva took place at Palexpo, Geneva (26–30 April 2023). As the most important global event devoted to inventions exclusively, the 1st in-person edition after the pandemic attracted a record number of visitors, inventors, universities, and companies worldwide. EdUHK won a total of 7 awards and received the University's first Gold Medal with Congratulations of the Jury, a highly prestigious recognition where less than 16% of the projects were awarded. Dr TSANG Yiu Fai Chris captured the Gold Medal with Congratulations of the Jury with his invention on Rapid Quantification of Microplastics in the 'Protection of the Environment – Energy' category. Another Gold Medal is conferred to Dr FU Hong's Intelligent Ocular Misalignment Measurement System. 5 other inventions received Bronze Medals.



Dr TSANG Yiu Fai Chris's team is also invited to the Hong Kong I&T Strives Ahead thematic forum cum celebration reception at the Hong Kong Science Park on 30 June 2023. The team introduced the awarded project to Government representatives Prof SUN Dong (Secretary for Innovation, Technology and Industry), Dr WANG Weiming (Director-General of the Department of Educational,

Scientific and Technological Affairs of the Liaison Office of the Central People's Government in the HKSAR), etc. along with other Hong Kong outstanding I&T achievements at the International Exhibition of Inventions Geneva.

2.5.2 QS-WHARTON REIMAGINE EDUCATION AWARDS

Known as the "Oscars" of Education, the QS-Wharton Reimagine Education Awards is a global competition rewarding innovative approaches that enhance student learning outcomes and employability. Dr LEUNG Chi Hin Michael received the Silver Award in Asia with his project Reimagining Music Learning with e-Orch, benefiting over 2,000 local students and training 300+ teachers since 2017.

3. PERFORMANCE MEASUREMENT AND PERFORMANCE INDICATORS (PIS)

The University has implemented performance indicators (PIs) to effectively track and monitor EdUHK's KT activities. All levels from faculties and university-level research centres to relevant academic support units are required to report on their KT activities annually, comprising data on the PIs specific to their key initiatives.

In 2022–23, we have redefined existing performance indicators and introduced new PIs to better reflect the impact of our KT initiatives with an emphasis on entrepreneurial activities. We have supported 78 entrepreneurial activities and 58 start-up teams involving 2,575 students, alumni and staff. With regard to short professional development programmes along with conferences, public lectures, exhibitions and other events for the external community, we have involved more key partners in their delivery by factors. The summary of PIs can be found in Annex XI.

4. LOOKING AHEAD

With the University's strong foundation in teacher education and as a leader in teacher education, EdUHK will continue to uphold the "Education-plus" approach, leveraging our complementary strengths and expanding our educational boundaries and innovation capacities. Strategic collaborations between EdUHK, HKSTP and Cyberport to foster I&T development are underway, while resources will be further invested to strengthen research centres for establishing multi-disciplinary strategic research in social networks and analytics, environment health, life and career development across the life span, and educational models for students with special needs, as well as emerging sectors beyond education.

To enhance innovation and entrepreneurship over the coming years, resources and support on large-scale external technology transfer grants and patent filing will be reinforced. Efforts would also be put into cultivating strong partnerships with entrepreneurs, investors, and universities locally and abroad, especially the GBA with Hong Kong's geographic advantage. By connecting EdUHK's research-based start-ups and spin-offs with the GBA market and pitching investors to entrepreneurial activities at an early stage, KT Sub-office incubates award-winning social ventures that receive a lot of development funds and are sustainable in the long run.

Supported by the growth in patent applications, I&T and entrepreneurial development, EdUHK will reach new heights with enhanced contribution to the local, regional and global community.

ANNEXES

Annex I Impact Case History (i)

Project Title

Social Metacognition and Big Data Network

Principal Investigator / Project Leader

Professor CHIU Ming Ming

Project Summary

The Social Metacognition and Big Data Network, recognised by the World Education Research Association (WERA), unites 36 researchers from 22 universities across 10 countries/regions (Australia, Germany, Japan, Hong Kong, mainland China, Norway, South Korea, Taiwan, UK, and USA). This network leverages artificial intelligence and advanced statistics to investigate various aspects of education, including (i) children's vocabulary and reading behaviours; (ii) the impact of student and teacher feedback; (iii) teacher discussions; (iv) team interactions; (v) student online actions; (vi) online debates; and (vii) online debater manners and strategies.

During 2022–23, the network produced 13 journal manuscripts and presented at 2 international conferences. The research engaged 1,238 students and 411 teachers from Hong Kong, Taiwan, the USA, Australia, Canada, the Caribbean, the Middle East and Europe. In addition, the collaboration helped researchers in the network win 5 new grants, totalling HKD 10,497,138.

Underpinning Research

Statistical discourse analysis (SDA, Chiu & Lehmann-Willenbrock, 2016) and other suitable, complementary methods such as process-outcome analyses (Chiu, 2018), discourse analysis (Johnstone, 2018) or content analysis (Krippendorf, 2012) are used to address the challenges of analysing social interactions in large, complex data sets.

The studies also gained insights from previous research on DigiLit Framework, curriculum-based professional learning (CBPL), corpus literacy framework, situational theory of problem-solving (STOPS), information market theory (MIT), and machine learning models like the support vector machine (SVM) and deep neural network (DNN).

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Details of Impact or Benefit

In 2022–23, the network produced 15 research outputs (including 13 journal manuscripts and 2 presentations at international conferences), won 5 new grants on the research of online social networks, and engaged 1,238 students and 411 teachers in Hong Kong, Taiwan, USA, Australia, Canada, Caribbean, Middle East and Europe in the studies. Below are the key findings and their implications for the education community:

- Exam essays from 695 Chinese students were analysed. Essays using a multi-discourse mode strategy featured more words, shorter sentences, more infrequent words, and more concrete words-- all of which contributed to higher scores.
- A survey of 199 literacy professors discovered that certain characteristics (e.g., interest in technology integration, digital literacy knowledge) and sufficient planning and practice time improved their preparation of pre-service teachers for using digital text or tool selection and integration.
- The synergetic effects of phonological and lexical skills on reading comprehension among 227 Hong Kong Chinese-English bilinguals in Grades 2-4 were examined. Structural equation growth modelling revealed that (i) phonological awareness, (ii) vocabulary, and (iii) word reading were significantly linked to one another and to initial reading comprehension in both first-language Chinese and second-language English, highlighting the synergistic effects of early phonological and lexical skills on reading comprehension.
- 183 teachers and student teachers were invited to participate in corpus training, develop their corpus literacy, and complete a survey. Based on the findings, several pedagogical recommendations were

proposed for corpus linguists, corpus website developers, and teacher educators to facilitate successful corpus literacy training for teachers and students: (i) focus on one corpus website at a time; (ii) create similar search interfaces and simplify search syntax; (iii) provide more hands-on corpus practice with corpus analysis during training; (iv) help teachers understand the limitations of corpus usage and identify alternative solutions.

In addition, the IRN is promoted through collaboration with researchers with expertise in different fields and won 5 new grants about social metacognition and big data.

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Annex I Impact Case History (ii)

Project Title

Development of High Grade Pellets Using Food Wastes for Safe and Quality Fish Production

Principal Investigator / Project Leader

Dr MAN Yu Bon

Project Summary

Food contamination and waste disposal are two major global environmental issues. The project team has successfully developed fish feed pellets consisting of food waste for farming freshwater and marine fish. The results indicated that food waste-based feeds (FWBFs) could produce safe and quality fish at a lower cost, which will benefit the reuse of food waste and sustainable fish farming.

Underpinning Research

The research team conducted extensive research on food waste recycling for sustainable fish farming. Food waste from local hotels and restaurants is used as major raw materials to produce high-quality fish feeds for growing commercial fish species, in order to ease waste disposal pressure of the existing landfills and develop sustainable local fish farming simultaneously.

The first relevant project sponsored by the Environmental and Conservation Fund (ECF: HK$1.9 million) aims to reactivate some abandoned local fishponds. Food waste was used as the primary ingredients of fish feeds, replacing a significant part of the fishmeal contained in fish feeds for growing low-trophic level freshwater fish: bighead (Hypophthalmichthys nobilis), grass carp (Ctenopharyngodon idellus) and mud carp (Cirrhinus molitorella). It was observed that fish fed with FWBFs were safe for consumption, with acceptable levels of polycyclic aromatic hydrocarbons (PAHs) and heavy metals (HMs), when compared with those fed commercial pellets. Based on the results, the research team was granted HK$4.5 million for an Innovation Technology Fund (ITF) (Innovation and Technology Bureau) in 2015, targeting a more in-depth study of recycling food waste for farming two important freshwater fish species: Nile tilapia (Oreochroms mossambcus) and jade perch (Scortum barcoo). The quality of FWBFs was improved by adding Chinese herbal medicine ingredients, probiotics, and other active ingredients, enhancing fish growth and immunity. It was further indicated that the concentrations of PAHs and HMs contained in the cultured fish were safe for consumption. In order to broaden the usage of FWBFs in farming marine fish, with higher nutritional requirements, a follow-up study was conducted with the support of HK$8.45 million from the Sustainable Fisheries Development Fund (SFDF) in 2017. After trying different FWBF formulas, it was revealed that a particular formula was well suited for farming Sabah giant grouper (Epinephelus fuscoguttatus × E. lanceolatus), a very popular marine fish cultured locally. Furthermore, major pollutants: PAHs and dioxins in the cultured fish were significantly lower than that in the market fish (of the same species). The feed formula was further upgraded by incorporating spirulina, a blue-green alga (Spirulina platensis), and results showed that supplementing fish diets with 5% of spirulina could improve the growth of the fish.

The use of FWBF instead of commercial fish feeds for fish farming could save up to 28.5% (2017), 24.5% (2017), and 28.6% (2019) of the total production cost for Nile tilapia, jade perch and Sabah giant grouper, respectively. Moreover, the fish products produced are safe for human consumption with acceptable levels of major pollutants: HMs, PAHs, and dioxins. Based on the results, it could be safely concluded that there is a great potential for using FWBF as an alternative to commercial feeds for cultivating safe and quality freshwater and marine fish, at a lower cost.

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Details of Impact or Benefit

The International Exhibition of Inventions in Geneva is the world's most prestigious innovation exhibition, arranged under the patronage of the World Intellectual Property Organization (WIPO) of the Swiss Government and the City of Geneva. The annual exhibition is a major global event dedicated to innovation and new products. The research team won a Silver Medal at the 47th International Exhibition of Inventions in Geneva (12 April 2019), due to the positive impact on the reuse of food waste and sustainable fish farming. The research outputs also received the "Research Output Prize" of the Faculty of Liberal Arts and Social Science (EdUHK) in 2020.

Recycling food waste into fish feeds not only reduces food waste and eases associated disposal problems, it also lowers the cost of producing feed pellets (20 % lower than the commercial fish feed, in general). Local fish farmers would benefit from the lower cost of fish feeds for growing quality fish. The research team has filed a patent for FWBF formula: "Production process and user instructions for Nile tilapia" (CN201810473652.5). The industry partner (Kowloon Environmental Development Limited) has been benefiting from the production of safe and good quality food waste-based fish feeds at a lower cost, "The price of the FWBF was about 20% lower than commercial fish feed. I strongly believe that the sales of FWBF would be more competitive than commercial fish feeds available in the local market".

The research has also attracted public attention to the reuse of food resources (recycling food waste into valuable products). A series of reports and news related to the topic can be accessed on the websites. Promotions were also

made on various occasions, including public events, innovation exhibitions and trade fairs in Hong Kong, Mainland China and overseas. The research team has also shared its work with policymakers and relevant professionals at the 3rd and 4th International Conference on Biological Waste as Resource in 2018 and 2019. It is believed that the technology has been disseminated to the government, fish farmers as well as relevant professionals and industrialists via a series of knowledge transformation and technical training workshops. The research team has been invited to deliver a talk (26 Nov 2020) on this impact case study, sponsored by the AFCD and Business Environment Council, aiming to promote the FWBFs to fish farmers, recyclers and fish feed producers, with the aim to transform the raw materials into valuable fish feeds for sustainable fish farming.

The FWBFs effectively foster safe and quality fish products with acceptable levels of HMs (such as mercury), dichlorodiphenyltrichloroethane (DDTs), and dioxins, which are important pollutants when considering food safety. This will directly lead to higher-quality fish products carrying lower pollutants. The general public can also benefit from the consumption of these fish products when they are introduced in the local fish markets.

Impact on education and student learning:

The evident-based research outcomes of the study (lectures and education video) were transferred into teaching materials for students at EdUHK, general education teachers and primary school students in Hong Kong supported by funding at EdUHK (Central Reserve Allocation Committee). In addition, Dr MAN Yu Bon is invited by the Education Bureau to give a talk on “Food safety, organic agriculture and sustainable development” (27 Nov 2020), sharing this research impact case study with more than 99 liberal studies teachers. Furthermore, more than 10 primary students have been trained to research food waste recycling for sustainable development supported by Education Bureau (Gifted Education Fund, 2021–2022).

The results derived from the studies have been published in more than 30 international scientific journals, 1 book chapter and 1 magazine. In addition, presentations (as plenary/invited talks) were made at several international meetings. Furthermore, related research grants s (Research Grants Council / General Research Fund, 2023–2025 (18300322) and Research Grants Council / Early Career Scheme, 2020–2023 (28300619) have been awarded. The major aim of these two grants is to recycle food waste/food processing waste for the production of activated carbon/biochar-supplemented fish feed to lower the uptake of persistent toxic Substances such as metal/loids, PAHs and PCBs in fish.

Annex I Impact Case History (iii)

Project Title

Adapted Physical Activity in Older Adults and People with Physical Activity

Principal Investigator / Project Leader

Dr LEUNG Ka Man

Project Summary

Dr LEUNG Ka Man and her colleagues' research has contributed at promoting active lifestyles in older adults and people with physical disabilities. Their research investigated and promoted a new form of ageing-specific physical activity, Light Volleyball (LVB) in Hong Kong, improving older adults' functional fitness and psychosocial health by organizing LVB classes and intervention as well as balance-focused exercise intervention, disseminating the knowledge/ skills of LVB to practitioners by publishing teaching kit and seminar. LVB is further developed and becomes another adapted physical activity, sitting light volleyball for people with physical disabilities.

Underpinning Research

The project team conducted a quasi-experimental intervention to evaluate the effects of 15-week Light Volleyball (LVB) intervention on physical and psychological attributes among 78 Hong Kong older adults aged 60 years or above by comparing LVB to a modified form of physical activity, rouliqiu (RLQ), and a control group. Other than the control group, participants in the LVB group also demonstrated greater cardiovascular endurance, upper extremity muscle strength, and physical activity enjoyment than participants in the RLQ group. Health practitioners may consider LVB an adapted PA intervention promoting health among older adults. In 2019-2024, Dr Leung and her team obtained a Research Impact Fund to investigate the effectiveness of an LVB intervention on physical and psychological health attributes among older adults in HKG by using both quantitative and qualitative methods with a larger sample (315 older adults, Leung et al., 2020). Upon receiving the consolidated evidence from the research work of the project, the team started the promotion and impact work in HKG and CHN by organizing i) train-the-trainer workshops, ii) LVB classes and iii) LVB competitions in HKG and CHN [Shenzhen (SZ) and Nanchang (NC)]. Overall, these research works suggested that future studies should follow up and examine health-related changes in other populations with lower fitness levels (e.g. People with physical disabilities, PWPD).

With reference to Paralympic Sitting Volleyball and LVB, Dr Leung and her team developed a new sport, SLVB, by examining PWPD's perceptions regarding playing LVB from a sitting position (Leung, Chu, & Wong, 2020). In a 16-week SLVB intervention, adults with physical disabilities (n = 32) in the SLVB group exhibited significant improvements in cardiovascular endurance, body composition, and physical activity enjoyment compared with those in the control group (Leung, Chung, & Chu, 2021). Using the social-ecological model (SEM, Mcleroy, Bibeau, Steckler, & Glacnz, 1988) as a qualitative study framework, participants described their experiences at the individual level (e.g., improved health and well-being) and an interpersonal level (e.g., teamwork) (Leung, Chung, & Chu, 2020). Three SLVB classes were also conducted at three special schools in HK. Significant improvements in muscular endurance and flexibility were observed among participating students (Wong & Leung, 2020). In the intervention, participants complained that the sportswear available in the existing market could not satisfy their needs nor prevent injuries while playing sports. A

study group of 15 PWPDs has been formed and interviewed about their perception of existing sport apparel in the market, such as their perceived needs and limitations. In 2022, Dr Leung and her team have worked with a local textile designer, Arto Wong to apply and transfer the knowledge and expertise in sitting light volleyball (sport) as well as textile and design to produce a tailor-made functional sportswear and accessories to PWPD (Knowledge Transfer Fund 2021–22, HK$99,478). Other than field tests such as sitting balance, qualitatively, participants agreed that the prototype attained the targeted design features: Easy to wear, Protection (reduced pain), and Sitting balance. Other than this KT fund, Dr Leung and her team also won another KT Fund (Knowledge Transfer Fund 2022–23, HK$99,956) to launch a pilot scheme to train the trainers, including VB/LVB professionals, pre-service or in-service PE teachers, etc. with skills and personal efficacy for coaching/assisting in coaching the future SLVB activities.

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Details of Impact or Benefit

Light volleyball for older adults

Promoting physical activity among older adults has become a significant health promotion strategy for the HKG and CHN governments. Light Volleyball (LVB), modified from conventional volleyball, is safer and easier to play than traditional volleyball. A pilot study conducted by Dr Leung and her team (Leung, Chung, & Hagger, 2018) revealed significant improvements in physical and psychological health among older adults in the LVB group compared to those in the control group. By extending the aforementioned work, Leung's team obtained a Research Impact Fund (RIF, HK$7.4 million, 2019-2024) to further investigate the effectiveness of an LVB intervention on physical and psychological health attributes among older adults in HKG by using both quantitative and qualitative methods with a

large sample (315 participants, Leung et al., 2020). One objective of RIF is to encourage local academics to consider and articulate the potential of research to benefit the wider community and to encourage more impactful and translational research projects. All the intervention programs have now been completed, and more follow-up measurements will be conducted in 2023. Also, partnered with Shenzhen Elderly Sports Association and Nanchang Light Volleyball Association in CHN, this funded project continues to promote LVB in HKG and CHN by organising i) train-the-trainer workshops (115 Hong Kong trainers are trained and 218 CHN trainers will be trained), ii) LVB classes (1000 HK and 2500 CHN older adults, about 400 HK older adults from 20 community or neighbourhood elderly centres joined) and iii) LVB competitions in HKG and CHN (Shenzhen and Nanchang). Last year, a) the LVB teaching aids (Leung, Tse, Chung, & Au, 2022), including written content (e.g., LVB skills and instruction, injury prevention, lesson plan, warm-up activities) and 3 YouTube videos (with 1,900 views, e.g., skills, warm up and ball sense activities for older adults) and b) a webpage have been developed for promoting the activities and LVB in older adults. These teaching aids (200 books) were already sent to 115 trained trainers and 40 partnered elderly centres and organisations).

To further enhance light volleyball, the Department of Health and Physical Education (HPE) has worked with Hong Kong Light Volleyball Association to organise the Light Volleyball League 2022 (180 participants) and Light Volleyball Competition for Teachers 2022 (80 participants) during 8–9 Oct 2022. Many organisations supported this competition in the society, such as the Liaison Office of the Central People's Government in the HKSAR, the Hong Kong Federation of Handicapped Youth (HKFHY), and Sham Shui Po Sports Association Ltd. In Aug 2022, with a discussion with the Volleyball Association of Hong Kong, China, as a recognised LVB expert in Beijing Sports University, HPE will work with them to conduct LVB coach workshops in Aug 2023.

Newly developed adapted physical activity for people with physical disabilities

An LVB pilot intervention study (Leung, Chung, & Hagger, 2018) showed that LVB was beneficial to older adults' health. This pilot study suggested that future studies should follow up and examine health-related changes in other populations with lower fitness levels (e.g. people with physical disabilities, PWPD). In 2020, Dr Leung and her team have newly developed an adapted physical activity, sitting light volleyball (SLVB). In SLVB, which combines Paralympic sitting volleyball and LVB, PWPD play LVB in a seated position. Another uniqueness of SLVB is its inclusiveness in that it enables players with and without PDs to play together and interactively. Her team first asked participants' perceptions of playing LVB using a wheelchair and in a seated position (Leung, Chu, & Wong, 2020). Then, in a 16-week SLVB intervention and three SLVB classes conducted at three special schools in HK, significant improvements in both physical and psychological health attributes such as muscular endurance and flexibility were observed.

From observation and comments from participants, PWPD in SLVB intervention may suffer from abrasion and sitting imbalance while playing SLVB on the floor but the sportswear available in the existing market could not satisfy their needs nor prevent injuries while playing sports. In 2022, Dr Leung and her team worked with local textile designer Arto Wong to apply and transfer the knowledge and expertise to produce tailor-made functional sportswear and accessories to PWPD (Knowledge Transfer Fund 2021–22, HK$99,478). Other than field test such as sitting balance, qualitatively, participants agreed that the eight prototypes in 2 sizes (S/M and M/L) attained the targeted design features: Easy to wear, Protection (reduced pain), and Sitting balance. This invention "A Garment for Sports or activities" is then applied for a patent in HK (reference no.: P00039.HKS) and China (202211489783.5) in Oct 2022 and the early 2023, respectively. This invention can be used by physically disabled athletes playing other seated sports or even in other activities in their daily lives. This sport pants was also exhibited in the Medical and Healthcare Fair 2022 (9–11 Nov 2022) and currently obtained a Bronze medal in the International Exhibition of Inventions of Geneva 2023.

Other than the above KT fund, Dr Leung and her team also won another KT Fund (Knowledge Transfer Fund 2022–23, HK$99,956) to launch a pilot scheme to train the trainers with skills and personal efficacy for coaching/assisting in coaching future SLVB activities. A SLVB teaching kit was also published in May 2023. In the community, her team successfully organised the first ever SLVB competition in Hong Kong or even worldwide during the competition mentioned above in Oct 2022 and received positive comments. Four teams of people with or without physical disabilities (48 participants) joined this competition. To initiate a more comprehensive PA program for PWPD, with HKFHY's donation, fitness tests on 215 PWPDs are conducted from Sept 2022 to Jan 2023. Its press conference was

conducted on 14 Jan 2023. Meanwhile, with the team's competence and expertise in LVB, the Volleyball Association of Hong Kong, China would like to ask for collaboration to promote volleyball in people with disabilities.

Annex I Impact Case History (iv)

Project Title

Chat with Children: An Online Professional Development Course on Interactional Quality for Hong Kong Kindergarten Teachers

Principal Investigator / Project Leader

Dr Alfredo BAUTISTA

Project Summary

Teacher-child interactions are the daily back-and-forth exchanges that teachers and children have with one another. Compelling evidence shows that the nature and quality of these interactions are among the most essential factors in determining the impact of Early Childhood Education (ECE) programs on children. However, prior research shows that the quality of teacher-child interactions in ECE settings tends to be low. "Chat with Children" is a package of digital learning resources (video lectures, research notes, classroom video clips) developed by the Centre for Educational and Developmental Sciences (CEDS) in 2020/21 to help Hong Kong kindergarten teachers improve their interactional quality. This CRAC project will design and implement a large-scale professional development (PD) course drawing on this package. Adopting design research principles, the project team will trial three pilot implementations of the PD. It will be a self-paced online course composed of 10 units. Interviews and focus group discussions will be conducted to enhance its quality. Pre-post questionnaires will be used to investigate its impact on teachers' self-perceptions of the importance of teacher-child interactions. The finalised version of the PD course will be publicly offered on the CEDS website, having the potential to help thousands of kindergarten teachers to enhance the quality of their interactions with children.

Underpinning Research

The Internet has become a powerful tool for delivering teacher learning initiatives, including teacher PD courses (Dennis & Horn, 2014). Research has shown that online learning resources, such as multimedia presentations and web-based materials, have the potential to serve as practical tools to facilitate teacher change and growth (Dede et al., 2009). In addition, online and technology-mediated learning can create sustainable education and development opportunities for teachers when face-to-face training is financially prohibitive (Stone-MacDonald & Douglass, 2015). Online PD courses utilizing digital resources can be highly effective for teachers, given their potential to showcase how interactional strategies can be used in natural environments (Brophy, 2004).

The use of digital learning resources to foster teacher learning, particularly classroom video clips, has been documented across multiple studies in recent years. As argued by Sherin (2004), "Video allows one to enter the world of the classroom without having to be in the position of teaching in-the-moment" (p.13). Researchers have demonstrated that using video for professional learning can help teachers improve their pedagogical skills, content knowledge, self-efficacy beliefs, and knowledge about children's learning (Sato et al., 2008; van Es & Sherin, 2008). For example, Saxe et al. (2001) compared three types of learning conditions and found that teachers who used video to observe children engaged in learning activities made the most remarkable performance gains.

A recent literature review in the field of ECE (Bautista et al., in press) shows that classroom video can transform pedagogy when used collaboratively as a tool for reflection, analysis, and consideration of alternative interactional strategies. There is compelling evidence that teachers who use video to analyse children's thinking become more effective at responding to their needs during lessons, and that a teacher's ability to evaluate classroom video is related to student learning (Cohen, 2004). Video cases of teaching can provide evidence of interactions that a teacher might overlook while teaching and a glimpse into the social components of classroom interactions (van Es & Sherin, 2008). However, to be a valuable tool for teacher learning, classroom videos must be used with a clear purpose, intentionally selected to address specific learning goals, within activities carefully planned to scaffold teacher learning (Brophy, 2004).

In this project, an online PD course based on videos and other digital resources will allow Hong Kong in-service kindergarten teachers to learn about the value and importance of high-quality interactions with children, as defined in the international literature (Downer et al., 2009; Hamre et al., 2012; Pianta, 2016). The team will take advantage of the multiple benefits of web-based education, such as convenient access, flexible pace, and the possibility of synchronous and asynchronous online interaction (Dede et al., 2009). This will facilitate the scaling and disseminating of the "Chat with Children" package. The low cost, convenience, and easy accessibility of online PD will allow thousands of kindergarten teachers to benefit from this online PD course.

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Details of Impact or Benefit

The main outcome and deliverable for this CRAC project is an online PD course targeted at in-service ECE educators in Hong Kong, entitled "Chat with Children". During the three pilot implementations, the project team will work with the teachers from at least 36 kindergartens (estimated average per kindergarten is 10 teachers, which results in a total of approximately 360 teachers):

- Pilot 1: One kindergarten (estimated N=10 teachers)
- Pilot 2: Five kindergartens (estimated N=50 teachers)
- Pilot 30: At least 30 kindergartens (approximately 300 teachers; maximum is unlimited).

Once the implementation of these three pilots is completed, the finalized resources and activities of the PD course will continue to be offered to Hong Kong kindergartens via the website of CEDS. Currently, there are around 14,000 kindergarten teachers in Hong Kong. This online PD course will be available to them free of charge, which has the potential to benefit Hong Kong's kindergarten sector at large, helping teachers enhance the quality of their interactions with children. As the resources and activities will be available online, teachers will have the freedom to take up the PD course as desired. This will contribute to further enhancing the pedagogical practices of Hong Kong kindergarten educators, thus contributing to the holistic development of local children. Additionally, the project team will use the Beliefs and Intentions Questionnaire (Wilcox-Herzog & Ward, 2004) to investigate the impact of the PD course on teachers' perceptions of the importance of teacher-child interaction. Results will be published in either a book chapter or a research paper.

The data collected as part of this CRAC project will be the seed for a subsequent GRF application. Obtaining external funds will allow CEDS to conduct a more systematic evaluation of the impact of the PD course in Hong Kong local kindergartens, thereby sustaining the project in the future.

While the "Chat with Children" package targets ECE teachers to improve their interactional quality in classroom settings, parents of kindergarten children can also utilise the resources when the PD course is available online. Many of the units in "Chat with Children" (i.e., mealtimes, playtime, reading strategies, questioning strategies) can be utilised by parents to enhance their interaction with children. The use of open-ended questions to stimulate children's curiosity and express themselves and facilitation of thick conversations during situations such as reading has been explored in similar projects, for example, in the project "Take a SIP – Science-Informed Parenting Video Series", led by Dr LAM Chun Bun Ian. Key materials from "Chat with Children" resources can be shared with CCFS, so as to build on each other's capacity.

Finally, through this project, CEDS will create new networks with the local community and will directly impact practice, which will, in turn, enhance EdUHK's position as a leader in the field of ECE. Teacher educators and PD providers (within Hong Kong and beyond) will be able to utilise the "Chat with Children" package within their training courses and programs, which will increase the visibility and reputation of EdUHK.

Annex I Impact Case History (v)

Project Title

Strengthening an Impact: Greening for SDGs

- Capacity building for addressing SDGs through curriculum and pedagogy innovation in TVET
- Creating an Impact: Setting up a Green Skills Hub at the EdUHK

Principal Investigator / Project Leader

Dr Margarita Pavlova

Project Summary

Dr Pavlova has been working to disseminate the results of the UNEVOC project funded by UNESCO (Capacity building for addressing SDGs through curriculum and pedagogy innovation in TVET) that was built on the CRAC project funded by the EdUHK (Creating an Impact: Setting up a Green Skills Hub at the EdUHK). The UNESCO project was aimed to support the capacity building of technical, vocational education teachers (TVET) to include generic green skills in the curriculum through changing pedagogy and development of teaching and learning resources. Thus, to strengthen the TVET practitioners' and leaders' knowledge of greening TVET and their ability to implement change.

Six UNEVOC Centres from Saudi Arabia, Nigeria, the Philippines, China and Mongolia that took part in the Coaction Initiative of the UNESCO-UNEVOC International Centre, Bonn last year worked on the project results implementation to achieve the required change. Currently, together with UNESCO-UNEVOC, the team is planning a Webinar in September with twofold purposes: to find out how participants have implemented training provided through the project, and to provide other members of the network an opportunity to understand how to green their curriculum.

The research results continue to be disseminated well beyond Hong Kong through engagement with international agencies and, most currently, with the members of the upcoming G20 meeting to impact their agenda and skills development practices for greening. This allows TVET/VPET leaders internationally (particularly through the UNESCO-UNEVOC network) to develop and apply a holistic approach towards greening the TVET curriculum and practical operations, thereby positively impacting the lowering of carbon emissions and supporting the greening of economies and societies.

Underpinning Research

The Central Reserve funded project led by Dr Pavlova focused on addressing generic green skills development in support of the realisation of SDGs in order to advance further green skills research and development in Hong Kong and the wider region. The project mapped the current practices related to curriculum greening by surveying one of the largest VPET providers in Hong Kong. 33 teaching staff from different disciplines in this substantial organisation completed the survey. These findings suggest that more innovative and interactive ways of teaching environmental content are needed in order to raise students' interests and deliver knowledge more effectively. In addition to research on curriculum greening practices among VPET providers in Hong Kong, the project investigates professional vocational education (PVE) teacher training practices at the EdUHK, and other universities in the region, with the aim to formulate

recommendations on how to address the development of generic green skills through curriculum changes and to develop resources that can be used for the development of generic green skills for VPET students and teachers.

The CRAC project provided a research foundation for further activities, including the UNESCO project. A research aspect of the UNESCO project focused on understanding how to develop effective capacity-building activities. This was examined using a self-assessment survey designed around teachers' competencies required for developing and implementing curriculum greening.

References to the Research

Invited presentations:

Pavlova, M. (2022, November 9-10). TVET partnerships with industry: Greening Skills in Hong Kong. The International Symposium 2030 SDGs Agenda: TVET and its contribution to sustainable development. Organised by Inacap, Chile.

Pavlova, M. (2022, August 19-20). Future Ready VTE: Green Skills for Sustainable Development. The World Vocational and Technical Education Development Conference. Organised by the Ministry of Education of the People's Republic of China, the Chinese National Commission for UNESCO and the Tianjin Municipal People's Government[online]. Beijing, China

Publications:

Pavlova, M., Ifeoma Akeredolu, I., Agamah, F. and Abosede Rufus, A. (July 2023) Challenges in Supporting Sustainability: Teacher Professional Development in Nigeria to be presented at JVET conference, Oxford, on UNESCO capacity building program and implementation of its results.

Pavlova, M. (2022). Green economies, green values – Story for the times. In K. Kennedy, M. Pavlova & J. C. -K. Lee (Eds.). Soft Skills and Hard Values: Meeting 21st Century Education Challenges. Routledge.

Kennedy, K., Pavlova, M. & J. C. -K. Lee (2022). The skills agenda in the 21st century – New directions & new values. In K. Kennedy, M. Pavlova & J. C. -K. Lee (Eds.). Soft Skills and Hard Values: Meeting 21st Century Education Challenges. Routledge.

Kennedy, K., Pavlova, M. & J. C. -K. Lee (2022). Constructing the future: Integrating values and skills to meet the challenges of a precarious world. In K. Kennedy, M. Pavlova & J. C. -K. Lee (Eds). Soft Skills and Hard Values: Meeting 21st Century Education Challenges. Routledge.

Pavlova, M. (2022). Unpacking Greening and Skills Recognition in Micro, Small and Medium Enterprises. In M. Pavlova & M. Singh (Eds.). Recognizing Green Skills through Non-formal Learning Settings: A Comparative Study in Asia (pp.3 – 22). SpringerNature.

Pavlova, M. (2022). Overview of the regional practices and challenges on environmental protection in four industries. In M. Pavlova & M. Singh (Eds.). Recognizing Green Skills through Non-formal Learning Settings: A Comparative Study in Asia (pp.23 – 37). SpringerNature.

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Pavlova, M. & Singh, M. (2022). Recommendations for supporting green skills inclusion in RVA. In M. Pavlova & M. Singh (Eds.). Recognizing Green Skills through Non-formal Learning Settings: A Comparative Study in Asia (pp.253- 269). SpringerNature.

Pavlova, M. and Chen, C.S. (2022). Improving the effectiveness of teacher training for the vocational education and training (VET) sector in China: trends, challenges and approaches. In J.C-K. Lee and T. Ehmke (Eds). Quality in Teacher Education and Professional Development: Issues and Prospects in Chinese and German Systems, Springer

Pavlova, M. & Chen, C.-S. (2020). Enhancing TVET teachers' capacity to develop students' generic green skills: a work-based learning model for professional development of teachers. In: TVET@Asia, issue 14, 1-23

Pavlova, M. (2019). Greening of the economy through partnerships: issues and impacts on skills development In S. McGrath, J. Papier, M. Mulder and R. Suart (Eds). Handbook of Vocational Education and Training: Developments in the Changing World of Work, Springer

Chen, S. C and Pavlova, M. (2019). Enhancing educators' capacity to incorporate generic green skills in pedagogical practices. International conference on Continuous Education for Sustainable Development: New challenges, 23–24 May 2019. Nur-Sultan, Kazakhstan

Details of Impact or Benefit

The main impact is on changing institutional practices in the greening curriculum. The CRAC project was beneficial in identifying the specific needs of TVET providers in terms of required resources and approaches towards including generic green skills into the TVET curriculum and TVET teacher training. Thus, in addition to publications, the results of this project have been widely disseminated through seminars and training workshops for TVET leaders: the Ministry of Labour and Vocational Training, Cambodia; GIZ (German international aid agency), ministry representatives and TVET leaders from 6 Pacific countries; UNEVOC members in the region; TVET practitioners in Australia; Malaysia and Saudi Arabia and New Zealand. They were commissioned by international and regional agencies such as UNESCO, Skills New Zealand, GIZ, governments and universities. These engagements impact the international and regional levels by raising and supporting government interest in greening TVET issues. One of Dr Pavlova's presentations has been published by the CVED, Ministry of Education of China.

The approach established during this project towards the development of generic green skills resources and the ways they can be used for greening the TVET curriculum and TVET teacher training has been considered to be innovative and very valuable by TVET leaders in the region, as well as the UNESCO-UNEVOC International Centre in Bonn. This conclusion is based on the current engagements with UNESCO on capacity building of TVET practitioners and leaders at the international level and the invitations Dr Pavlova received to present the project results and on the interest expressed by participants as well as feedback following her presentations and capacity building activities.

Annex II Approved KT Fund Projects 2022–23

Project Investigator	Project Title
Dr CHEN Junjun	Documenting and Promoting the Occupational Well-being of Principals in Hong Kong and Mainland: A Mixed Method Approach
Dr LEUNG Ka Man	A Pilot Scheme for Training the Trainers to Empower People with Physical Disabilities (PWPD) in Playing the Sitting Light Volleyball (SLVB)
Dr YANG Lan	What Can Secondary Students Benefit from Team-based E-Assessment (TEA) and Immediate Feedback? Examining the Impact of TEA on Student Learning via Knowledge Transfer Activities
Dr CHAN Ka Shing Kevin	Self-stigma Reduction Programme for Families of Autistic Children
Dr SONG Yanjie	Developing the Learningverse Prototype – a 3D Educational Metaverse Solution Focusing on Functionalising Social Interactions between Avatars
Dr TSO Van Yip Ricky	A Convenient Package of Study Skills Training for College Students with Developmental Disorders (SpLD, ASD & ADHD)
Dr CHUNG Ming Yan Louisa	Development of Game-basis Learning Materials for Children to Promote Healthy Eating and Hand Hygiene
Dr POON Tsz Chun Eric	Application of a Community-based Telehealth Program for Post-COVID Recovery

Annex III Approved iTech Fund Projects 2022–23

Project Investigator	Project Title
Dr TONG Xiuhong	Applying EEG Technique to Testing the Effectiveness of Applied Behaviour Analysis (ABA) in Children with Autism Spectrum Disorder
Prof YU Leung Ho Philip	A Machine Learning Approach to Identify Differences in Brain Activities for Autism Spectrum Disorder in an Applied Behaviour Analysis Program
Dr YEUNG Siu Sze	Social Robot for Second Language Learning
Dr TING Sze Thou Fridolin	LearnToEarn: Motivating Active Learning and Teaching through a Reward-based Student Response System (SRS)
Dr HUNG Keung	Novel Technologies (Animation Art, Interactive Art & AR) in Modern Puppet

Annex IV Approved Fund for Innovation, Technology, and Social-wellbeing Projects (Sep 2021–Aug 2023)

Project Investigator	Project Title
Dr HUNG Keung	Novel Interactive and Audible 3D Chinese Characters for People with Special Needs: "An Inclusive Design and Educational Workshop"
Dr LEUNG Chi Hin Michael	Innovating Music for Everyone: Music Creation and Performance with e-Orch
Dr CHAN Ka Shing Kevin	Mindfulness-based Stigma Stress Reduction Programme for Children with Neurodevelopmental Disorders and their Parents
Dr KAM Chi Shan Anna	Screening for Mild Cognitive Impairment, Dementia, and Hearing Loss in Older Adults in the Community with Special Automated Audiological Assessments

Annex V List of Patent Applications 2022–23

Note: Entries with patents granted are highlighted

Inventor List	Name of Patent	Serial Number of Patent	Country/ Region	Date of Application / Grant
Dr SONG Yanjie Prof YU Leung Ho Philip Prof LEE Chi Kin John Mr WU Kaiyi Mr CAO Jiaxin	A System and Method for Animating An Avatar in a Virtual World	HK30068004	Hong Kong	09/2022
		US17/893,505	United States	08/2022
	用於在虛擬世界中動畫化化身的系統	CN202211009301.1	Mainland China	08/2022
Dr ZOU Di Ms LIU Yalin	Emotion Recognition System and Method	HK30074872	Hong Kong	01/2023
	情緒分類系統和方法	CN202211125523.X	Mainland China	09/2022
Dr LEUNG Ka Man Dr CHAN Ka Man + Non-EdUHK (1)	A Garment for Sports or Activity	HK32022062561.2	Hong Kong	10/2022
	用於運動或活動的服裝	CN202211489783.5	Mainland China	11/2022
Dr XIE Haoran (former staff) Dr CHAN Wai Hong Ms WANG Jingjing	一種個性化線上學習與職業雙向推薦方法及系統	ZL 201910878676.3	Mainland China	11/2022

Inventor List	Name of Patent	Serial Number of Patent	Country/ Region	Date of Application / Grant
Dr FU Hong Dr SONG Yanjie + Non-EdUHK (1)	A System for Strabismus Assessment and a Method of Strabismus Assessment	HK30074359	Hong Kong	12/2022
		US18/092,983	United States	01/2023
Dr HUNG Keung	An Interactive System and A Method for Assisting a User to Meditate using the Interactive System	HK30074356	Hong Kong	12/2022
Dr HUNG Keung	A Method for Facilitating Language Learning Using a Tactile-based Language Learning System	HK30074357	Hong Kong	12/2022
		US18/155,910	United States	01/2023
Prof LEUNG Bo Wah Dr LEUNG Chi Hin Michael	An Apparatus for Opera Performance & Teaching	HK30074358	Hong Kong	12/2022
Dr FU Hong + Non-EdUHK (3)	An Eye-gaze Tracking Apparatus and a Method of Eye-gaze Tracking	HK30076493	Hong Kong	02/2023
		US18/164,447	United States	01/2023
Dr ZOU Di (co-own with LU) + Non-EdUHK (1)	A Personalized Word Learning System Based on Deep Neural Network	HK30079801	Hong Kong	04/2023
	一種基於深度神經網路的個性化單詞學習系統	CN202310064765.0	Mainland China	01/2023

Inventor List	Name of Patent	Serial Number of Patent	Country/ Region	Date of Application / Grant
Dr MUNG Wai Yin Steve	An Electrical Circuit Component for an RF/EM Circuit, A Method for Use In RF/EM Circuit Design and An Electrical Circuit Design Platform	US18/164,776	United States	02/2023
Dr MUNG Wai Yin Steve + Non-EdUHK (2)	Compact Matching Networks for Gallium Nitride Doherty Power Amplifier in a Small Form-Factor Package	US18/341,934	United States	06/2023
Dr TSANG Yiu Fai Chris	Method of Quantifying Microplastic Mass	US18/173,178	United States	02/2023
		HK32023068932.7	Hong Kong	02/2023

Annex VI EASE Fund Winning Teams 2022–23

#	EASE Fund Team	Team Summary
1	Bridge Neuro Limited	Bridge Neuro aims to utilise contemporary technology to help detect and predict students' attention levels in order to help teachers make timely adjustments. The team intends to develop its own electroencephalogram headset to improve the learning and teaching experiences of SEN students and teachers.
2	Culture Origin Limited	Culture Origin's mission is to provide a 'blended learning' platform that combines Chinese history, geography and literature to help students connect with Chinese culture. Through immersive experiences with VR and other digital tools, the objective is to enhance students' cultural identity and understanding in a meaningful and engaging way.
3	Fennet Company Limited	Fennet's Chinese learning app, Vividize provides a fast and memorable way to study Chinese characters. Interest towards Mandarin is growing globally, yet non-native students struggle to learn Chinese characters effectively. Vividize therefore provides a solution by using visual stories.
4	Frozen Veggies Kulturkreis Company Limited	Frozen Veggies Kulturkreis has produced an online game integrating cultural studies, which is simultaneously enjoyable and beneficial to the public. Their name uses the analogy of the packs of mixed vegetables popular in Hong Kong to represent cultural fusion.
5	Gamilearn Limited	GAMILEARN is a gamified learning platform for primary students. Its aim is to redefine language learning through gamification and AI. This will make students eager to learn, using the fun and interactive games created, and ultimately make learning as attractive as mobile games.
6	SENodyssey Limited	SENodyssey is a social enterprise that promotes the well-being of children with special educational needs. The team is currently developing a neurofeedback AI-based Mapping Expert System (NAMES) to provide a one-stop service platform. NAMES will be able to assess and map children to specific interventions, and subsequently monitor their training progress using its neurofeedback mechanism.

Annex VII EASE Fund 2022–23 Special Awards Winning Teams

#	Special Award	EASE Fund Team
1	Social Impact Award	SENodyssey Limited
2	Technology Excellence Award	Gamilearn Limited
3	Award for Best Presentation	Fennet Company Limited

Annex VIII EdUHK-HKSTP Co-Ideation (2022–23) Winning Teams

#	EASE Fund Team	Team Summary
1	AIdEd Limited	AIdEd's MotorUp is an iPad game that integrates learning and physical exercise elements. It adopts the idea of 'gamification' to encourage students to exercise more, and enhance their sports skills and physical fitness.
2	Bridge Neuro Limited	Bridge Neuro aims to utilise contemporary technology to help detect and predict students' attention levels in order to help teachers make timely adjustments. The team intends to develop its own electroencephalogram headset to improve the learning and teaching experiences of SEN students and teachers.
3	Culture Origin Limited	Culture Origin's mission is to provide a 'blended learning' platform that combines Chinese history, geography and literature to help students connect with Chinese culture. Through immersive experiences with VR and other digital tools, the objective is to enhance students' cultural identity and understanding in a meaningful and engaging way.
4	Fennet Company Limited	Fennet's Chinese learning app, Vividize provides a fast and memorable way to study Chinese characters. Interest towards Mandarin is growing globally, yet non-native students struggle to learn Chinese characters effectively. Vividize therefore provides a solution by using visual stories.

#	EASE Fund Team	Team Summary
5	FutventureLab Limited	FutventureLab aims to devise a comprehensive Entrepreneurship Education programme – This is FUTURE – with social emotional learning and leadership training. To enhance learning efficiency, a hybrid teaching mode is adapted. The future direction of FutventureLab is to develop an evidence-based curriculum, and a metaverse e-learning platform for entrepreneurship education.
6	Gamilearn Limited	GAMILEARN is a gamified learning platform for primary students. Its aim is to redefine language learning through gamification and AI. This will make students eager to learn, using the fun and interactive games created, and ultimately make learning as attractive as mobile games.
7	New Chance Career Education	New Chance Career Education aims to provide secondary school students with more opportunities to explore possible career pathways, allowing them to discover their passions and assisting them in selecting university majors.
8	SENodyssey Limited	SENodyssey is a social enterprise that promotes the well-being of children with special educational needs. The team is currently developing a neurofeedback AI-based Mapping Expert System (NAMES) to provide a one-stop service platform. NAMES will be able to assess and map children to specific interventions, and subsequently monitor their training progress using its neurofeedback mechanism.
9	Sing to Speak Limited	'Sing to Speak' is a social enterprise promoting melodic intonation therapy for pre-schoolers. It uses neuroscience and AI technology to build therapeutic models with training data. The goal is to provide timely, comprehensive and quality training for children with special needs.
10	STRAW Education Limited	STRAW (Speak to Read and Write) is an innovative solution to learning Chinese, which facilitates learners' understanding through artistically designed graphic characters and other tailor-made features. The objective is to redesign the learning process of Chinese, backed by solid research and creative methods, and to make the language more popular globally.

Annex IX Highlighted External Achievements of EdUHK Start-ups 2022–23

EdUHK Start-up	Nature of Business	External Achievement
Keweya Education Technology	Online Career Education Platform	• PolyU Micro Fund • HKSTP Ideation Program
NerOcean	Biotech (Dissolved oxygen sensors)	• Winner of Wofoo SDG Awards
READily	Teaching software generating English reading comprehension questions	• City U 300 Seed Fund • HKSTP Ideation Program • CUHK PI Startup Award • hackUST: The Most FAiL- First Attempt in Learning - Award
The Anthropocene Limited	STEM and sustainability education	• Winner of Wofoo SDG Awards
Winkybuddy	Emotional fun learning kits and animation for ADHD children and parents	• HKSTP Ideation Program

Annex X International Award-Winning Projects 2022–23

2023		
Project Title	**Principal Investigator(s)**	**Award(s)**
International Exhibition of Inventions Geneva		
Total no. of projects: 7	**Total no. of awards: 7**	
Rapid Quantification of Microplastics Using Total Organic Carbon Analysis with Simple Sample Pretreatment	Dr TSANG Yiu Fai Chris	Gold Medal with Congratulations of Jury
An Intelligent Ocular Misalignment Measurement System	Dr FU Hong, Dr SONG Yanjie	Gold Medal
A Tuneable Multi-feature Active Noise Cancellation Headset	Dr MUNG Wai Yin Steve	Bronze Medal
Audio-Tactile Chinese Characters: Bringing Multisensory & Novel Learning Experience to people with visual impairment and with Special Needs	Dr HUNG Keung	Bronze Medal
Learningverse - a 3D metaverse for online collaborative learning	Dr SONG Yanjie, Prof YU Leung Ho Philip	Bronze Medal
Nano-Sensor System for Meat and Seafood Monitoring	Prof CHOW Cheuk Fai Stephen	Bronze Medal
Sitting Light Volleyball and Its Functional Sports Garment	Dr LEUNG Ka Man	Bronze Medal

2022		
Project Title	**Principal Investigator(s)**	**Award(s)**
Reimagine Education Award 2022		
Total no. of projects: 1	**Total no. of awards: 1**	
Reimagining Music Learning with e-Orch	Dr LEUNG Chi Hin Michael	Silver Award in Asia
International Innovation and Invention Competition in Taiwan (IIIC)		
Total no. of projects: 5	**Total no. of awards: 5**	
Advanced Tai Chi Experience: An Integration of Novel Typefaces and AR Technology	Dr HUNG Keung	Gold Medal
Facilitating Emotion Classification Based on Non-Intrusive Learner Data via Deep Neural Networks	Dr ZOU Di	Gold Medal
Reimagining Music Learning with e-Orch	Dr LEUNG Chi Hin Michael	Gold Medal
Smart hands: Are you sure?	Dr OR Pui Lai Peggy	Silver Medal
Upcycling Waste Residuals into Value-added Eco-coasters: From Environmental Facilities to Tables	Dr TSANG Yiu Fai Chris	Silver Medal
International Invention Innovation Competition in Canada (iCAN)		
Total no. of projects: 10	**Total no. of awards: 26**	
A New Generation of Dissolved Oxygen Sensor Using Replaceable Photo-sensing Film	Prof WU Shiu Sun Rudolf	Gold Medal, Top 10 Best Invention Award, Special Award
Reimagining Music Learning with e-Orch	Dr LEUNG Chi Hin Michael	Gold Medal, Top 20 Best Invention Award, Special Award

2022 *(cont'd)*		
Project Title	**Principal Investigator(s)**	**Award(s)**
International Invention Innovation Competition in Canada (iCAN) *(cont'd)*		
Upcycling Waste Residuals into Value-added Eco-coasters: From Environmental Facilities to Tables	Dr TSANG Yiu Fai Chris	Gold Medal, Organizer's Choice Award, Special Award
Facilitating Emotion Classification Based on Non-Intrusive Learner Data via Deep Neural Networks	Dr ZOU Di	Gold Medal, Jury's Choice Award, Special Award
Advanced Tai Chi Experience: An Integration of Novel Typefaces and AR Technology	Dr HUNG Keung	Gold Medal, Special Awards x 2
iMaze: A Fun Working Memory Training for Pre-school Children from Low-income Families	Dr POON Kei Yan Kean	Silver Medal, Best Woman Inventor Award, Special Award
Personalized vocabulary learning system based on artificial intelligence techniques	Dr ZOU Di	Gold Medal, Special Award
UNISON: Unpaired Cross-lingual Image Captioning	Prof YU Leung Ho Philip	Gold Medal, Special Award
CKC Strokes – An Online Practice Tool for Chinese Strokes Writing	Dr TSE Ka Ho	Silver Medal, Special Award
Smart hands: Are you sure?	Dr OR Pui Lai Peggy	Silver Medal, Special Award

Annex XI Summary of Performance Indicators

Summary of Performance Indicators of Knowledge Transfer Activities			2022/23 (1 July – 30 June)
1	Contract Research	Number of Projects	53
		Income from Projects	$68,313,509
		Number of Key Partners	130
2	Collaborative Research Projects	Number of Projects	45
		Income from Projects	$23,626,942
		Number of Key Partners	135
3	Consultancy	Number of Projects	50
		Income from Projects	$63,598,556
		Number of Key Partners	63
4	Intellectual Properties	Number of Patents Filed	19
		Number of Patents Granted	9
		Number of International Invention Awards Received	39
5	IP Licensing	Number of Active Licences	5
		Income Generated	$51,258
6	Entrepreneurial Activities	Number of Entrepreneurial Activities	78
		Number of Start-up Teams Supported	58
		Number of Attendance by Students	2,351
		Number of Attendance by Alumni	135
		Number of Attendance by Staff	89
7	Social, Community and Cultural Engagement	Number of Activities	25
		Number of Key Partners	90
8	Continuing Professional Development (CPD) Courses	Number of CPD Courses	73
		Income from CPD Courses	$53,531,294
		Number of Key Partners	193
		Number of Student Contact Hours	50,267
9	Public Dissemination and Speeches	Number of Activities	411
		Number of Key Partners	1,113
10	Staff Engaged as Professional Consultants or Members of External Advisory Bodies	Number of Staff Engaged	156

Note: The performance indicators presented in this report have been redefined and newly introduced. Direct comparison with past data may not be valid.