University Accountability Agreement (UAA)

Institution-specific Key Performance Indicators (KPIs) (as at July 2021)

The Hong Kong Polytechnic University (PolyU)

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PolyU: Performance review by domain and supplementary tables

The following sections provide a summary of the performance of PolyU institutional-specific KPIs in each of the five domains of the UAA. Many of the sector-wide performance measures and institutional-specific KPIs are already regularly tracked within the University for progress monitoring and for continuous improvement.

Domain 1: The quality of the student experience of teaching and learning

	KPI Name and Description	2016/17	2017/18	2018/19	2019/20
KPI 1	**Average Annual income of fresh graduates**				
	Average annual salary (HK$) of full-time graduates in full-time employment (including commission).	$231,996	$236,381	$244,260	$250,021
KPI 2	**Percentage of students enrolled in service-learning subjects**				
	This KPI refers to the percentage of students (FYFD and SY) enrolled in Service-Learning subjects.	26.50%	25.30%	26.80%	25.70%
KPI 3	**Percentage of subjects adopting blended learning / flipped classroom approaches**				
	The number of subjects comprised of technology-enhanced active learning for more than 30% of class time as a proportion of all subjects offered. Measured in phases according to the blended learning adoption across the University with initial phase targeted at large classes (subjects of 200 or more students enrolled).	57.10%	70.97%	84.62%	80%
KPI 4	Number of UGC teaching awards in 2017/18 - 2019/20: 1 award Teaching grants received in 2019-22 triennium: HK$142.2 million				

Notes:

(i) In 2019/20 the average annual salary of graduates in full-time employment (including commission) was over $250,000, representing an increase of 2.4% over the previous year. The average annual income of PolyU graduates has remained close to the sector average in the past three years.

(ii) Service-Learning is a key pillar of the undergraduate curriculum in our endeavour to develop graduates into responsible global citizens. The number of students enrolled in Service Learning remains stable at approximately one quarter of undergraduate students in every cohort. In 2019/20, 3,833 students enrolled in Service-Learning subjects. As Service Learning is a mandatory subject for undergraduate students and PolyU has now developed this capacity, the next phase of focus will be to increase the number of non-local Service Learning opportunities.

(iii) Blended learning brings the best of both classroom and e-learning together, and PolyU is taking a phased approach to blended learning adoption by commencing with subjects offered to large classes (200 or more students enrolled). Currently, around 80% of such subjects in the University utilise technology-enhanced active learning for more than 30% of class time. With maturing adoption of technology-enhanced active learning in large classes, this KPI can be broadened to better reflect the diversity of blended learning; for instance by adopting a definition of the number of subjects utilising active and innovative teaching pedagogy.

(iv) Teaching excellence is integral to the student experience and PolyU's dedication to teaching is demonstrated with the attainment of one UGC award from 2017/18 to 2019/20. The value of UGC-funded teaching and learning related grants for the 2019-22 triennium reached HK$142.2 million.

Domain 2: The Quality of Research Performance and of Research Postgraduate Experience

KPI Name and Description	2011-2015	2013 - 2017	2014-2018
KPI 1(a) Citations per output			
Citation count on a 5-year average / Total no. of publications. Both citations and output metrics as extracted from SciVal, which takes data from Scopus. (self-citations excluded)	18.6	14.4	16.7
KPI 1(b) Percentage of output in top journal percentiles			
	Journal articles only		
Proportion of research output published in top 10% Scopus journals based on CiteScore.	43.30%	47.00%	46.50%
	All publication types		
	39.20%	43.50%	43.60%

KPI Name and Description	2017/18	2018/19	2019/20
KPI 2 Number of world-leading disciplines ranked Top 50 in the QS subject ranking			
Number of subjects ranked within the top 50 of the latest QS subject ranking.	9 subjects	6 subjects	6 subjects
KPI 3 Percentage of non-local interdisciplinary research projects			
Percentage of ongoing interdisciplinary projects involving international collaboration.	11.30%	12.11%	14.31%
KPI 4 Percentage of Research Postgraduate students published in Top 10% cited Scopus journals and conference proceedings			
Proportion of research output produced by RPg students published in top 10% Scopus journals and conference proceedings based on Citescore as a percentage of all research output produced by RPg students.	30.94%	32.72%	39.68%

Notes:

(i) KPI 1(a) and KPI 1(b) are calculated based on data from Scopus covering journal publications spanning the period 2014 – 2018 (excluding self-citations) produced by PolyU.

(ii) KPI 2 is derived from the QS World University Rankings by Subject 2020. PolyU attained six subjects in the global Top 50 including:

- Architecture/ Built Environment
- Art & Design
- Engineering – Civil and Structural
- Hospitality & Leisure Management
- Linguistics
- Nursing

(iii) PolyU encourages staff members to actively participate in international collaboration. KPI 3 shows an increasing trend of non-local interdisciplinary research collaboration. To enable better measurement and the ability to benchmark performance, KPI 3 requires refinement and a better measurement going forward can be examining the proportion of international research output.

(iv) Cultivating an active research culture among the research postgraduate students is an essential part of the research postgraduate experience. Research postgraduates are encouraged to disseminate research findings and publish in quality journals and proceedings. In 2019/20, almost 40% of the 1,066 research outputs produced by our research postgraduate students are published in the top 10% cited Scopus journals and conference proceedings.

Domain 3: Knowledge transfer and wider engagement

KPI Name and Description	2017/18	2018/19	2019/20
KPI 1 KT impact cases with economic and/or social impact			
Qualitative summaries of examples of KT with significant economic/social impact.			
KPI 2 Cumulative number of startup ventures created by students, graduates or staff with support from the University's seed funding and entrepreneurship programs in the last three years			
Number of all the startups by entrepreneurship funding schemes administered under the Institute for Entrepreneurship of PolyU, that excludes the number of same startups repeatedly supported by more than one funding schemes of the University.	253	271	332
KPI 3 Survival rate of startup ventures			
Percentage of startup ventures funded for more than 3 years still in operation.	61%	61%	56%
KPI 4 Number of partnerships for KT and entrepreneurship activities			
Community partnership for KT and entrepreneurship activities – number of companies, industry associations and government bodies/departments with partnership with PolyU.	111	164	180

Notes:

(i) KPI 2 data coverage is up to June 2020 and includes social enterprises.

(ii) PolyU is a forerunner in offering funding and support to promote innovation and entrepreneurship among students and staff. Through a variety of funding schemes administered by the University, as at end of 2019/20 financial year, 332 start-ups were supported in the last three years. Their survival rate is encouraging and 56% of the PolyU-supported graduate or staff start-ups formed three or more years ago are still in operation.

(iii) The University continues to develop regional partnerships with institutions and intermediaries for leveraging local and regional resources supporting knowledge transfer (KT) and entrepreneurship endeavours. In 2019/20, the number of partnerships supporting licensing endeavours, entrepreneurship education, seed funding and incubation efforts stands at 180, representing almost a 10% increase from that of the previous year.

Knowledge Transfer Impact Cases

KT, entrepreneurship and community engagement is central to supporting education and research. Translation of innovation and insights into impact on business and the wider community is a core part of the focus on creating advancements that will better the world and benefit mankind. We are delighted to share some examples of the application of research innovations underpinned by solid scholarly research work conducted at PolyU.

KT Case 1: PolyU's Space Instruments Contribute to Nation's First Lunar Sample Return Mission

For nearly two decades, PolyU has been actively developing revolutionary tools and instruments for both international and national space exploration missions aimed at uncovering the mystery of outer space. Since 2010, PolyU has been contributing to national space projects including Chang'e 3 in 2013, Chang'e 4 in 2019, and Tianwen 1 in 2020, in collaboration with the China Academy of Space Technology (CAST).

In 2020, PolyU successfully developed and manufactured the Surface Sampling and Packing System (the System), a mission-critical component of the Chang'e 5, the Nation's first lunar sample return mission. The System was developed by a team led by Professor YUNG Kai-leung, Chair Professor of Precision Engineering and Associate Head of Industrial and Systems Engineering of PolyU. The team comprises 20 members, with Dr Robert Tam, Associate Director of PolyU's Industrial Centre, as a key member. The System is a highly sophisticated invention with advanced robotic technologies developed through an innovative approach for lunar sample acquisition. Collecting a large quantity of lunar samples through robotic means was unprecedented.

The System is made up of more than 400 components precisely designed with optimal materials including various alloys and with a high level of precision, accuracy and reliability. It can cope with various extreme conditions in the space environment and journey, such as the high daytime surface temperature of the Moon up to 200°C, the impact and shock during lift-offs and landings, high-vacuum environment, solar winds and cosmic rays, and a very strict payload limit. Due to the stringent weight constraint, the System was specially designed to perform multiple functions, including collecting samples of lunar regolith in loose and sticky form, providing vision guidance with two heat-resistant nearfield cameras during sample acquisition, and packaging and sealing the samples in a container, as well as self-cooling.

The historic mission with the System started when the Chang'e 5 spacecraft was launched on 24 November 2020. On 1 December, the ascender and lander of the spacecraft landed on the Moon to acquire 2 kg lunar samples with the System. The space expedition successfully concluded with the lunar samples brought back to Earth on 17 December. PolyU will continue to contribute to Chang'e 6 and other national space missions with its wealth of experience, scientific research, innovations and knowledge transfer endeavours.

KT Case 2: Peptide-Based Data Storage for China's Next-generation Manned Spacecraft

Data storage is critical to the advancement of information technology in the 5G and big data era, as humankind has been generating digital data at an exponential rate. Such trend is also seen in space missions where a huge amount of digital data is generated and recorded. The conventional data storage devices such as optical, magnetic or semiconductor devices show limitations on the data storage capacity and the durability of the retained data. To overcome this challenge, PolyU's researchers have ingeniously combined the proteomics and data storage mechanism to develop a novel technology as a massive data storage medium based on the use of peptides, which are short chains of amino acids, during the space exploration in a China's next-generation manned spacecraft.

Pioneered and developed by the research team led by Dr YAO Zhong-ping, Associate Professor of the Department of Applied Biology and Chemical Technology and Professor Francis LAU, Professor and Associate Head of the Department of Electronic and Information Engineering, the technology makes use of peptides for the storage of digital data and tandem mass spectrometry for its retrieval. Compared with existing commercial data storage devices and other developing technologies such as DNA data storage, peptides offer a much higher storage density and longer storage duration with the data still retrievable even after thousands of years. As such, this new technology has high potential in storing and retrieving enormous data with tiny physical spaces.

For testing the data storage for space exploration, the research team collaborated with the China Aerospace Science and Technology Corporation (CASC) to send data-encoded peptides to space in China's manned spacecraft launched on 5 May 2020. After exposing to the extreme radiation in space environment for 3 days, the spacecraft carrying the peptides returned to Earth. The peptides were subsequently analysed with all the stored data correctly retrieved, proving the robustness of peptides as a storage media in space missions. Further experiments and development will be performed to achieve the highest storage density and stability.

The well-developed peptide synthesis industry allows fast peptide synthesis and sequencing with an exponential cost decline in the last decade, though the cost per megabyte of peptide data storage is currently much higher than conventional storage technologies. With this trend, the technology has other potential applications such as archiving of large volumes of digital data by governmental agencies and corporations, and even has the potential to transform the data storage industry in future.

KT Case 3: Design, Supply and Installation of Structural Health Monitoring System for Cross Bay Link, Tseung Kwan O - Main Bridge

The Faculty of Construction and Environment has developed systematic theories and techniques in system design, system identification, damage diagnosis and prognosis, resilience and sustainability, rating system and life cycle management of structural health monitoring for large structures. The underpinning research has produced significant impact through its direct adoption in landmark structures. Recently, the structural health monitoring team led by Ir Prof. You-Lin Xu has been engaged by CCCC Highway Consultants Co., Ltd. to develop an innovative Structural Health Monitoring System for the Cross Bay Link – Tseung Kwan O-Main Bridge.

This new structural health monitoring system will have more than 1,000 sensors of 12 types for load and structural response monitoring spanning across the 1.8km bridge connecting the Tsueng Kwan O – Lam Tin Tunnel at the west end and Wan Po Road near Area 86 of TKO at the east. Two new and innovative systems, the structural health evaluation system (SHES) and the structural health rating system (SHRS), will be developed to provide highly effective and user-friendly online structural health monitoring together with the bridge inspection system and the bridge management system.

The main functions of the SHES are to analyze and interpret the measurement data recorded by the structural health monitoring system to get an in-depth understanding of environments and loads and their effects on the bridge; compare the analyzed or interpreted measurement results with design values so as to evaluate the working status of the bridge; carry out health evaluation works of the bridge by using advance analyses and considering the results from the routine principal inspection; highlight the abnormal cases and initiate the special inspection if necessary; and help the bridge management system for corrective maintenance and management decision.

The SHRS, working together with the SHES and the bridge inspection system, can be used to decide the time intervals of routine general inspection of key structural components of the main bridge of Cross Bay Link and help the bridge management system for preventive maintenance and management decision.

The effective and efficient combination of the structural health monitoring technology, the bridge inspection and the bridge management will not only preserve the functionality, safety and durability of the bridge but also reduce the time and cost in the maintenance, repair, and life-cycle management of the bridge.

Construction of the bridge is expected to complete in 2022. This new system will allow the bridge to be scientifically monitored and easily maintained and managed during its design life of 120 years.

Domain 4: Enhanced Internationalisation

KPI Name and Description	2017/18	2018/19	2019/20	2020/21
KPI 1 **Number and percentage of non-local undergraduate student enrolment from Belt and Road countries/regions**				
Number of non-local undergraduate students from Belt and Road countries/regions.	1,356	1,624	1,643	1,832
Percentage of non-local undergraduate students from Belt and Road countries/regions.	81.10%	90.40%	88.40%	92.20%

KPI Name and Description	2017/18	2018/19	2019/20
KPI 2 **Percentage of full-time academic staff hired from outside Hong Kong**			
Percentage of full-time permanent and visiting staff recruited outside Hong Kong.	37.50%	37.0%	39.2%
KPI 3 **Number of partnerships with non-local universities and organizations for student experience, research collaboration and KT**			
Number of partnerships with non-local universities and organizations for student experience, research collaboration and KT.	368	475	514

Notes:

(i) Enhanced internationalisation nurtures our students' international perspective so that they can develop as global citizens, and make a meaningful contribution to their community and the world. Students from the Belt and Road countries/regions (KPI 1) comprise around 92% of the non-local student body. Aside from Mainland China, a large majority of the non-local undergraduate student body comes from the Republic of Korea, Kazakhstan, Indonesia and Malaysia.

(ii) The University is devoted to recruiting the best talents from around the world. In 2019/20, there are over 39% of full-time permanent and visiting staff recruited outside Hong Kong.

(iii) Growth in the number of partnerships with non-local universities and organisations for student experience, research collaboration and KT (KPI 3) is recorded and exceeds 510. These partnerships are a valuable means to bring diversified mobility opportunities for our students and enhance the University's research collaboration and knowledge transfer endeavours.

Domain 5: Financial health and institutional sustainability

KPI Name and Description			*Actual*		*Forecast*	
			2018/19	2019/20	2020/21	2021/22
KPI 1	Percentage of expenditure for teaching, learning, student and general educational services, research to total expenditure	Consolidated Level	73%	74%	75%	75%
		University Level	77%	78%	79%	80%

No.	KPI Name	2017/18	2018/19	2019/20
KPI 2	**Percentage fulfillment of planned Assistant Professor positions**			
Number of full-time Assistant Professor positions (including Research Assistant Professor) fulfilled within the financial year.		66%	65%	58%
KPI 3	**Percentage of middle-management academic and non-academic staff enrolled in training or receiving staff development support**	64.5%	61.5%	53.4%

Notes:

(i) To ensure financial sustainability of the institution in the longer term, the University closely monitors the sector-wide and institution-specific key performance measures. The forecast performance measures are prepared with reference to the data and information in the UGC Grant letters.

(ii) In view of the global pandemic and challenges ahead, University will adopt prudent financial management and carefully scrutinize its spending to sustain financial health while accelerating the investment in the core functions and especially to strengthen the teaching and research capability. A higher percentage of the University's expenditure will be allocated to teaching, learning, student and general educational services and research over the years.

(iii) The University will continue its endeavours to maintain stable income through the generation of revenues from various sources to ensure financial stability. While subventions from the UGC continues to be the major source of income for the University, the University maintains stable income from its self-financing activities and secures support from various funding bodies to maintain a balanced mix of income and bolster the strategic development of the University.

(iv) The financial position of the University is reviewed regularly to identify and manage potential risk. As reflected in the current ratio and coverage of the university's expenditure by reserves and cash and cash equivalent, the University exercises a prudent and disciplined approach in preserving a reasonable level of reserves to cater unforeseen fluctuation of spending requirement and safeguard its financial health and sustainability.

(v) Human resource is a key asset and timely talent acquisition is of importance to support teaching and research needs. In 2019/20, 58% of planned Assistant Professor positions were filled within the financial year. Beyond acquisition, grooming of talent is a priority and the University provides extensive opportunities for continued professional development for both academic and non-academic staff. In 2019/20, 53.4% of middle-management academic and non-academic staff were enrolled in both in-house and external development programmes. The results of KPI 2 and KPI 3 are slightly affected by the Covid-19 pandemic.