Knowledge exchange: A strategy for open access success at The University of Hong Kong[®]

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Abstract The University of Hong Kong's statement on vision now has three themes: 1) Research, 2) teaching & learning, and 3) knowledge exchange (KE). KE emphasizes HKU's desire to interact with its community for a mutual benefit. A new five-year strategic plan (2009–2014) sets out operational priorities and key indicators to enable knowledge exchange at HKU. Chief among these is the establishment of an exchange hub to make HKU researchers and their research products highly visible. The institutional repository of HKU, the HKU Scholars Hub, developed by its University Libraries, has become this KE exchange hub. Now the Hub includes HKU ResearcherPages, featuring the accomplishments of each HKU professoriate staff. HKU's policy on knowledge exchange and the HKU ResearcherPages have increased the incentive for faculties, departments, and authors to place more items in open access (OA). This paper will discuss what KE is, the benefits it can bring to the university and its reputation, and how it can increase OA deposit.

Keywords Institutional repository, University of Hong Kong (HKU), Knowledge transfer, Knowledge exchange (KE), Scopus, ResearcherID, Google Scholar, ORCID

1 Introduction

Many universities and research institutions around the world now recognize the necessity and the value of knowledge transfer (KT), sometimes known as the "third mission" of the institution. Examples include the Knowledge Transfer Portal of the Research Councils UK (RCUK)^[1], and the Knowledge Transfer and Partnerships Program at the University of Melbourne^[2].

The University Grants Committee (UGC), the research funding body for tertiary education in Hong Kong, set up a knowledge transfer working group in 2007, and in 2009, it charged and funded all of its eight tertiary education institutions to begin programmes for knowledge transfer (KT). Their definition of KT is as follows:



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"... The systems and processes by which knowledge including technology, know-how, expertise and skills are transferred between higher education institutions and society, leading to innovative, profitable or economic or social improvements" [3].

The University of Hong Kong (HKU) is one of the eight institutions governed and funded by the UGC. Upon receiving this new directive, HKU created many new initiatives to accomplish and measure KT, but with HKU characteristics. In 2009, the HKU statements on vision and mission were re-articulated to show three strategic themes: 1) Teaching & learning, 2) research, and 3) knowledge exchange (KE). The University chose to use these words, KE, in order to emphasize that KT is bilateral and goes beyond technology transfer, as shown in their following definition:

"The University defines knowledge exchange as engaging, for mutual benefit, with business, government or the public to generate, acquire, apply and make accessible the knowledge needed to enhance material, human, social, cultural and environmental well-being. It not only includes technology transfer but also encompasses all disciplines, including the arts and humanities and the social sciences, and is a two-way process" [4].

HKU's strategic planning unit developed a five-year plan for the years 2009–2014, showing several strategic initiatives to accomplish KE. A knowledge exchange office (KEO) was set up to facilitate HKU KE under the directorship of the Pro Vice-Chancellor for Research. The KEO invited proposals from HKU faculties, departments and centres for KE projects. Evaluation and subsequent disbursement of KE funds were determined on how well each proposal could accomplish the following KE key indicators (partial list)^[5]:

- Item counts of HKU theses in open access (OA)
- Item counts of HKU research in OA
- Applications for patents
- Download counts of the items mentioned above
- Staff number available for media contact
- Number of collaborative researches
- Number of contract researches
- Number of consultancies, and income thereby generated
- Number of invited public lectures, symposia, exhibitions, performances & honorary degree speeches
- Number of University staff invited to be mentors
- Positive media impact related to knowledge transfer coverage, including print, online and electronic media
- Appointments of external members to HKU advisory boards



Many proposals won funding. Three of these were from the University Libraries (HKUL), all focusing on how to make the HKU researchers and their research results more visible.

1.1 Springer Open Choice publishing

With KE funding, HKUL made an agreement with Springer for Springer Open Choice (i.e. the gold OA model of publishing) for HKU authors^[6]. After passing peer review, HKU authored papers will be published as usual, and also in OA on SpringerLink. The published PDF will also be sent to HKU for deposit in HKU's institutional repository (IR). If relevant, it will also be sent to PubMed Central. This is a one-year pilot project, and will be evaluated by both Springer and HKU in March 2011.

1.2 HKU data correction

The three major citation databases in the world now are Web of Knowledge (WoK)^[7], Scopus^[8], and Google Scholar (GS)^[9]. They have become more and more important in the visibility of research institutions on the Web. Rightly or wrongly, their indicators of paper count and citation count have been used in university rankings and research assessment exercises (RAE) to measure impact. These same counts also influence peer review, which is usually another measure in these rankings and RAEs. However, the data in these three sources often show errors. Because the results are of such great importance to the reputation of HKU and its researchers, HKU KEO has decided on a pilot program of data correction, and provided funding for staffing.

1.3 KE Exchange Hub

HKU's IR, i.e. the HKU Scholars Hub (hereafter abbreviated as the Hub^[10]), began in 2005 with a mission to collect, preserve, and provide open access to the intellectual output of HKU. The HKU KEO realized that the goal of the Hub, namely, OA on HKU research, largely already aligned with that of KE. The Hub could directly measure several KE's key indicators, and promote the increase of other indicators. Therefore, the Hub was funded as a "KE Exchange Hub", with the new and added goals as follows:

- An expert finder, showing many relevant particulars on every HKU scholar, enabling their discovery by searchers in government, industry and academia;
- A current research information system (CRIS), storing, integrating and displaying data on all aspects of HKU research;
- A supplier of metrics to evaluate HKU experts and their research; and
- An "exchange hub" to show and measure all relevant HKU KE activities.



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2 Methodology

2.1 Springer Open Choice

Although the agreement covers all authors or co-authors affiliated with HKU, the choice of receiving this Open Access option is given to the authors, who must actively claim this option in the Springer online submission process. For this purpose, Springer and HKUL started a marketing strategy in February 2010 to inform and persuade HKU authors to claim the Open Choice publishing option, which included posting relevant information on web pages, presenting posters on campus, e-mailing the information to targeted authors, and presenting a series of seminars in every HKU faculty. We identified HKU editors of Springer journals, and asked those, who have used Springer Open Choice, to share their OA experience with HKU authors.

2.2 HKU data corrections

2.2.1 Scopus

The data in Scopus is very good. Unfortunately, affiliation names and author names in Scopus are often problematic. The UGC institutions in Hong Kong have very similar names in English and in Chinese, for instance:

- City University of Hong Kong (CityU), 香港城市大學
- Hong Kong University of Science & Technology (HKUST), 香港科技大學
- The Chinese University of Hong Kong (CUHK), 香港中文大學
- The Hong Kong Polytechnic University (HKPU), 香港理工大學
- The University of Hong Kong (HKU), 香港大學
- etc.

Because of this, papers often show wrong affiliations. Another reason of wrong affiliations is that Elsevier has received wrong metadata from some publishers. These publishers have only recorded the affiliation of the first author. Co-authors are often erroneously shown with the affiliation of the first author.

Scopus shows author profile pages, with papers and metrics cumulating to individual authors. However, the machine algorithm, which creates these pages from metadata received from publishers, often erroneously merges two similar named individuals. Chinese names, specifically surname with initial(s) present formidable problems. For example, "于", "余", "俞", "虞", or "庾", all become "Yu" when romanized. In addition, the machine algorithm can become too discriminatory, and thus create two or more author profiles for one author.



For all kinds of such problems, Elsevier provides a procedure for HKUL to report and request a "data-merge" or a "data-split". It usually takes Elsevier 6 weeks to enact these changes, but Elsevier guarantees that every change they make will be correct forever.

2.2.2 WoK

WoK data is likewise valuable and also comprised by errors. However, our efforts with WoK could find no similar method of correcting HKU data. We then turned to another Thomson Reuters product, ResearcherID^[11]. We used XML files in batch mode to create ResearcherID accounts for each HKU professoriate staff. We downloaded their publication data from the HKU Research Output System, transformed them into XML, and uploaded the XML metadata to these accounts. We then gave the unique ResearcherID and password to each individual researcher for editing their personal information by themselves. If the data matches upon entries in WoK, citation metrics from WoK will accrue in real-time to the entry of individual ResearcherID, and cumulate to its author.

2.2.3 HKU data rectification of Google Scholar

Google Scholar (GS) has similar valuable data conflicted by errors. Our queries to Google on GS remain unanswered, which is *de rigueur* according to our colleagues' previous experience. However, many HKU scholars prefer GS over Scopus and WoK because of GS' larger scope in time, disciplines, and material types (books!). We therefore created a process for these colleagues to use "Publish or Perish" software to obtain GS entries with no errors, and upload the bibliometrics and RIS file to the Hub.

2.3 KE Exchange Hub

Traditional IRs are items-centric, with metadata records on authored items, such as books, articles, etc., and with a hyperlink to the OA fulltext object. Besides IR items in OA, the KE initiative also called for a second online locus, or a type of record, where details particular to any HKU author could be found. Upon examining the data available to us, we found a third type of record, grant applications, whose details can be shown and integrated with the other two types. The addition of the record type "grant applications" allows the Hub to "provide access to research information and to disseminate such research information as people, projects, organizations, results (publications, patents and products), facilities and equipment", which is the core definition of a current research information system (CRIS)^[13].

To achieve this goal, we designed new pages in the Hub for author profiles and grant applications, showing details unique to each, and interlinking with each other



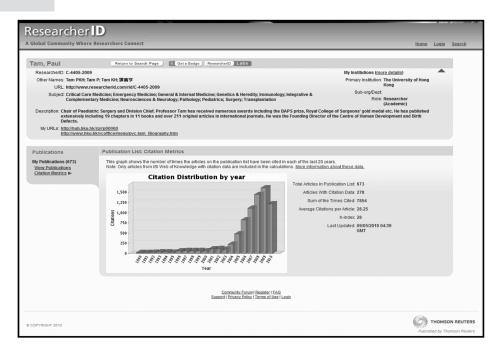


Fig. 1 Example of ResearcherID (September 2010).

and publication items. We named the author profiles, ResearcherPages (RPs), with a nod to the work of the University of Rochester^[14]. We tendered for these pages to be engineered, and for the DSpace hosting the Hub, to integrate with them. CILEA Consorzio Interuniversitario^[15] won this tender and became our partner in the development. The first round of enhancements completed in 2009, with a second round to follow in October 2010.

2.3.1 Data sources within HKU

To build and popularize these new record types of ResearcherPages and grant applications, we extracted data from several silos internal and external to HKU to quickly build a mash-up. Chief amongst these is the Research Output System (ROS), with online data since 1994. If we found items of a current HKU author, we imported all data into the Hub. Match points on HKU staff number and ROS publication number allowed an automatic linkage between corresponding item records, ResearcherPages, and grant application. This one-time upload of all retrospective data in the Hub means that the Hub can display complete publication lists for HKU authors. Many publication entries are accompanied by fulltext objects, but not all, as permission has not been obtained for all.



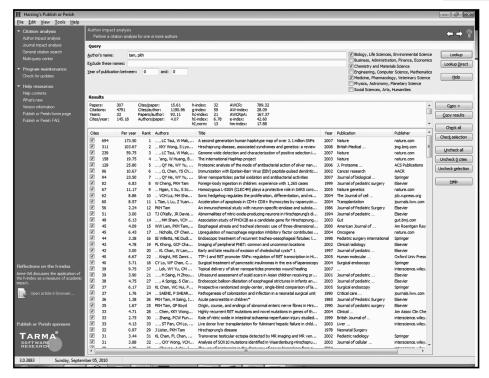


Fig. 2 Example of "Publish or Perish" with GS data (September 2010).

We used the Scopus API to add the Scopus EID and DOI numbers, which will allow a user with a paid subscription to download the fulltext from the journal publisher. This same Scopus API and the WoK API allow us to show the Scopus and WoS citation counts in real time for each matching Hub item.

KEO arranged permission for Hub administrators to extract initially from HKU silos and then for weekly updates. In 2009, Hub administrators set up an unattended batch process to extract data from the sources shown in Table 1, and CILEA created a procedure that would load the data into the Hub.

2.3.2 Data sources outside of HKU

The work described above with Scopus, ResearcherID, and GS is providing clean data on HKU authors without ambiguity. We set up screen scraping, APIs, and in the case of GS, an author intermediated procedure, to harvest the data and import them into the Hub.



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Table 1 Data elements & sources of HKU

Data element	Source of HKU	
Publications, awards, prizes, etc	ROS	
Contact details	Communications directory	
Professional qualifications	Central personnel database	
Supervision of research postgraduate students	Postgraduate student systems	
Expertise/research interest	APA	
Public & community service	Community service database	
Research grants received & project undertaken as	Research & conference grant administration	
principal or co-principal investigator	system (RCGAS)	
Patents applied & granted	Technology transfer office	
Picture	Departmental/personal web pages	
Subjects for media comment	Media content directory	

3 Results

3.1 Springer Open Choice publishing

The terms of the agreement with Springer Open Choice publishing require that details remain confidential. Our results after six months show that the target number of HKU articles with Open Choice will be exceeded at the end of the year 2010. Thus, Springer and the HKU KEO intend to extend this agreement for one more year.

3.2 HKU data rectification

By September 2009, we corrected 600 author profiles in Scopus, and found a further 700 HKU author profiles in Scopus needing disambiguation. We created ResearcherIDs for all 1,300 HKU authors, and became thus the first institution in the world to do this for its entire professoriate staff^[16-17]. The harvesting of HKU data in Scopus, WoK, and GS and the data input into the Hub ResearcherPages have allowed authors and their readers to easily click into those databases, and explore networks of co-authors and citers on the similar research. The data from these vendors displayed in the Hub is hyperlinked back to these vendors, and thus increases traffic to them.

Our work required us to liaise frequently with the HKU authors. Through such efforts, many of them have become aware of their web presence projected by these databases, and have begun to edit and ask for correction themselves. All of these several efforts at online reputation management by the individual authors lead to an enhanced reputation of their sponsoring institution.

3.3 KE Exchange Hub

In the initial stage of the project in 2009, Hub administrators, CILEA, and the data providers produced many new features. The highlights are described here and shown in the screen captures of Fig. 3 and Fig. 4.



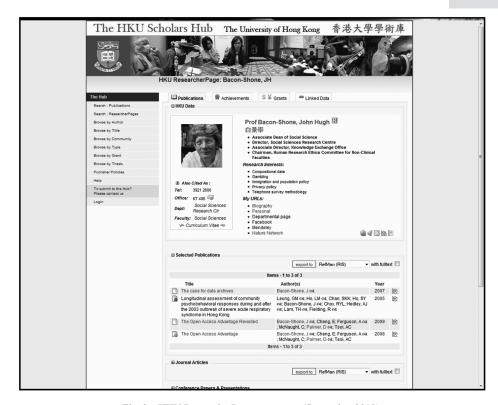


Fig. 3 HKU ResearcherPages prototype (September 2010).

- HKU ResearcherPages. HKU ResearcherPages record author-centric details and metrics, and perform linkage to publication items and grant applications.
- Publication lists. Publication lists show icons against each entry to indicate if a fulltext or a linkage to a fulltext is available. They allow authors to create "select lists" or to hide entries. They allow export in several formats. They allow e-mail alerts and RSS feeds on publication additions to the author.
- Metric pages. Metric pages show downloads and view counts for each publication, and cumulate for each author.
- Achievements section. The Achievements section shows community services, honours, awards, prizes, supervision of research students, and academic qualifications.
- Grant applications. Grant applications allow authors to search on title, panel, keywords, sponsor, etc. They show and hyperlink to each co-investigator and publication.
- Linked data. Linked data shows paper and citation counts, which are hyperlinked to complete data in Scopus, WoK, and GS.



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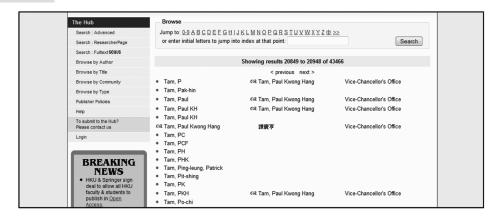


Fig. 4 Authority control. Roman & CJK variants. The "Cal" denotes established heading.

- Authority control. Authority control is indexing to gather variant author names together and disambiguate like-named individuals in Roman scripts and in any script supported by UTF-8 (Fig. 4).
- Single sign-on (SSO). SSO uses the HKU LDAP (CAS). RP owners login to edit or add details, personalizing their individual RP. RP owners can choose to hide data extracted from other sources, which must be edited in the source silo, and not in the Hub.
- Unique author identifier. Unique author identifier disambiguates further each current HKU author. The number appears in the ResearcherPage URL (ex. http://hub.hku.hk/rp/rp00060). Elsevier and Thomson Reuters will allow this number to be written in the Scopus AuthorID and ResearcherID records in the future, which will increase the trust of all three sources of disambiguated identity.
- High visibility of HKU's research and authors. Relevant searches in Google usually show an entry for the Hub, at or near the top of the list.

4 Discussion

KE and OA have different meanings, but they are very similar in desired outcomes. The Canadian Institutes of Health Research (CIHR) launched funding and policy decisions upon ideas similar to KT and KE. CIHR has named their version "knowledge translation" [18]. Under the requirements of knowledge translation, researchers supported by CIHR funds must ensure that their research output, such as papers and data sets, must be available in open access^[19]. CIHR grant funding may be used to pay for articles in hybrid journals, such as Springer's Open Choice journals.



Before the advent of KE at HKU, and as reported from other resources^[20–21], we found that the HKU faculty are not compelled by issues of OA, or self-archiving in an IR. The advent of HKU KE has changed this paradigm. The University receives money for KE from its funder, UGC. Key indicators for KE include the number of items placed in OA and download counts. It is in the University's interest to see these counts increase in order that funding will continue. HKU faculties and departments are likewise similarly charged to do, show and measure KE. The University's Senior Management Team and KEO hope to include KE key indicators in the performance appraisal of the professoriate staff in 2011.

Will the HKU KE policy result in an increase in OA deposit? It is still too early to say. We continue to receive all HKU theses because of HKU policy made in 2001 requiring students to deposit in electronic format. The agreement for Springer's Open Choice has allowed deposit of many published PDFs into the Hub. On top of this, we have seen a slight increase in OA deposit of postprints or author's manuscripts. Besides the addition of KE indicators to faculty performance appraisals, much higher rates of OA deposit may arrive with,

- The passage of an Intellectual Property Rights document, now before the HKU Senate. This will give the University non-exclusive right to post online all content authored by HKU authors when publishers allow.
- The implementation of SWORD^[22] on the top of the Hub's DSpace to automatically harvest HKU authored materials from PubMed Central and other OA repositories, for deposit in the Hub.

We have noticed positive activities in ResearcherID. Table 2 shows that the total paper count of all HKU authors has increased by 2.95% during the period from May 1, 2010 to Sept.1, 2010. This activity was solely due to individual authors' logging in, which has added 1,643 items. The increment in citation counts and h-index may have a similar cause, but they could be explained by the expected normal increase in citations over time.

Table 2 ResearcherID count increment

	May 1, 2010	Sept. 1, 2010	Percentage increment (%)
RID paper count	55,735	57,378	2.95
RID citation count	346,374	403,667	16.54
RID h-index	4,892	5,308	8.5

Furthermore, UHK Libraries have also gained other positive outcomes as below:

4.1 ORCID

A new worldwide initiative was announced in December 2009, the Open Researcher & Contributor ID (ORCID)^[23]. Members include Elsevier, Thomson Reuters, major



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publishers, and several large universities. The ORCID will be based upon or perhaps use the ResearcherID, and will be operational in early 2012. Authors will use the ORCID when submitting articles to publishers. Publishers will record the ORCID in the metadata for each article, and pass to third parties such as Scopus and WoK. Therefore, institutions, publishers, and database managers will finally have a way to disambiguate authors and assign unambiguous identity. At this time, HKU is the only institution in the world to have ResearcherIDs for all of its authors. In early 2012, we expect to announce to our HKU authors that they must begin using the ResearcherID/ORCID to submit articles to publishers, record their publications in the HKU ROS, and to be placed in their CVs, etc. With each member already having a ResearcherID, we expect almost a full and immediate compliance. This will finally solve the problems of HKU authors name ambiguity.

4.2 Re-positioning the library

A recent report on research assessment in 5 countries by OCLC highlighted the role of libraries in this process. It is noted that in those countries where bibliometrics are central to RAEs, academic libraries and librarians are often pivotal^[24].

A companion report to the above gave 7 recommendations on how libraries can "provide a researcher-centred view"^[25]. Curating the institution's research output and providing expertise in bibliometrics for RAEs and other purposes are new directions in which libraries can move to their benefit. This will increase their usefulness to researchers and the institution, and correspondingly align libraries with the mission and vision of the hosting institution.

5 Conclusion

The KE initiative and funding at HKU has moved its IR into new directions, complimentary and supplementary to OA. The viability of the Hub relies no longer solely upon the success of OA. The Hub has become the exchange hub for KE. It has also become 1) an expert finder for those who wish to find an HKU specialist for contract or a collaborative research project, a media comment, or supervision of graduate students, etc.; 2) a system to supply documents and metrics for RAEs; 3) a current research information system; and 4) a system to forge the necessary culture for KE within HKU and to engage the faculty in delivering the desired outcomes of KE.

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National Science Library, Chinese Academy of Sciences Because of HKU KE, the Hub has become sustainable and mission critical. The Hub is aligned with a core mission of the University, and is a vehicle for several operational priorities in its strategic plan. The University's success in winning new funds depends to a large extent on the success of the Hub.

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