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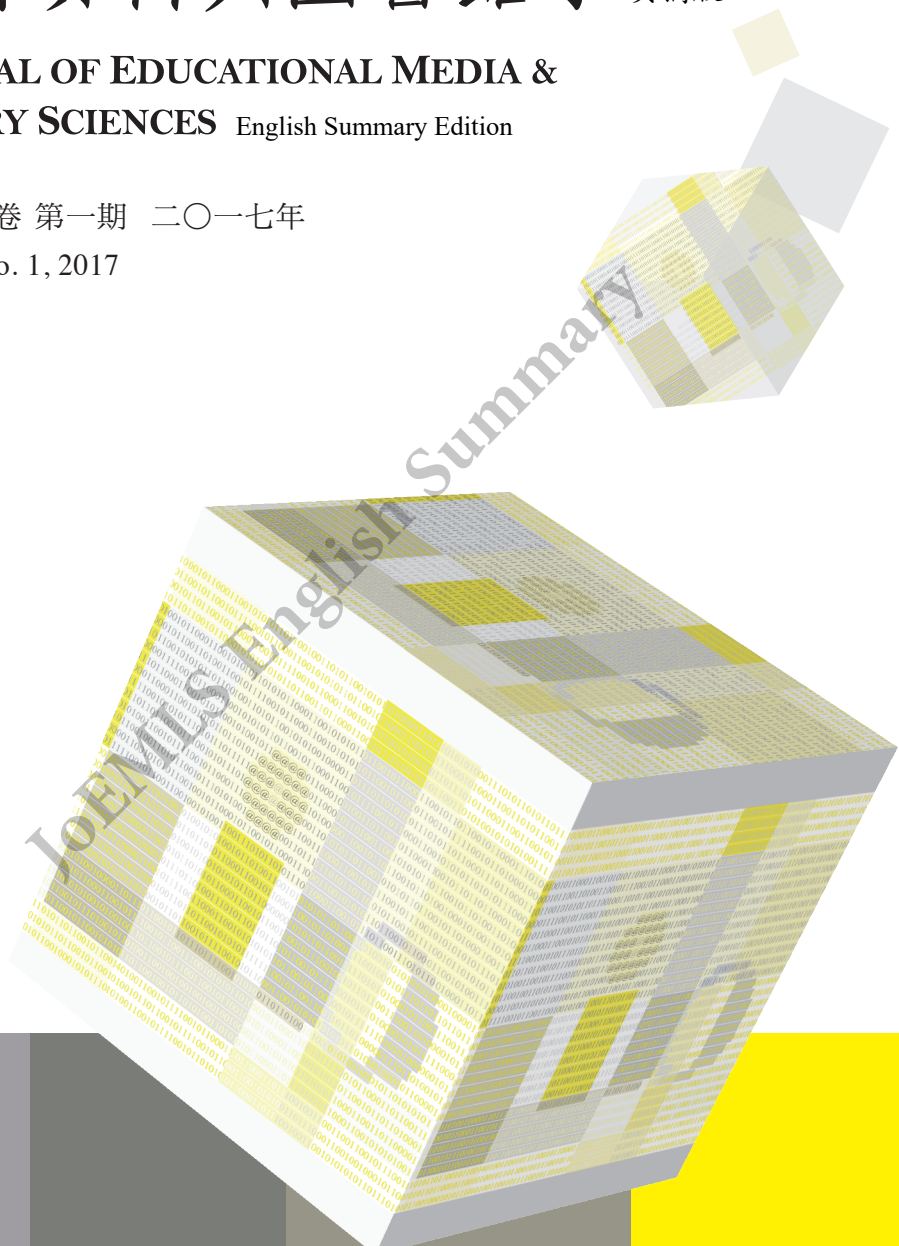
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教育資料與圖書館學，始於1970年3月創刊之教育資料科學月刊，其間於1980年9月更名為教育資料科學，並改以季刊發行。自1982年9月起易今名。另自2016年11月起，改以一年出版三期（3月、7月、11月）。現由淡江大學出版中心出版，淡江大學資訊與圖書館學系和覺生紀念圖書館合作策劃編輯。本刊為國際學術期刊，2008年獲國科會學術期刊評比為第一級，2015年獲科技部人文社會科學研究中心評定為教育學門專業類A級期刊。並廣為海內外知名資料庫所收錄(如下英文所列)。

**The JOURNAL OF EDUCATIONAL MEDIA & LIBRARY SCIENCES (JoEMLS)**, published by the Tamkang University Press and co-published with the Department of Information & Library Science (DILS) and Chueh Sheng Memorial Library, was formerly the **Bulletin of Educational Media Science** (March 1970 – June 1980) and the **Journal of Educational Media Science** (September 1980 – June 1982). In 2015, The JoEMLS is acknowledged as the A class scholarly journal in Taiwan by Ministry of Science and Technology (MOST). Since November 2016, the JoEMLS has been changed from quarterly to a tri-annual journal, published in March, July, and November.

The JoEMLS is indexed or abstracted in

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教育資料與圖書館學 封面意義：躍升於紙本印象上的數位與網路化圖書資訊圖騰。

The cover design of JoEMLS signifies:

L (Librarianship); I (Information Technology); B (Bibliophile and the Book trade)

# 教育資料與圖書館學

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本刊係採開放存取 (Open Access) 與商業資料庫付費途徑，雙軌發行之國際學術期刊，兼具電子版與紙本之平行出版模式。本刊除秉持學術規範與同儕評閱精神外，亦積極邁向 InfoLibrary 寓意之學域整合與資訊數位化理念，以反映當代圖書資訊學研究趨勢、圖書館典藏內容與應用服務為本；且以探討國內外相關學術領域之理論與實務發展，包括圖書館學、資訊科學與科技、書業與出版研究等，並旁及符合圖書資訊應用發展之教學科技與資訊傳播論述。

### **Open Access 典藏政策**

*JoEMLS* 向來以「綠色期刊出版者」(Green Publisher / Journal) 自居，同意且鼓勵作者將自己投稿至 *JoEMLS* 之稿件，不論同儕評閱修訂稿與否，都能自行善加利用處理，但希望有若干限制：

- (1) 勿將已刊登之修訂稿 (post-print) 再自行轉為營利目的之使用；
- (2) 典藏版以期刊排印之 PDF 檔為首選；
- (3) 任何稿件之典藏版本皆須註明其與 *JoEMLS* 之關係或出版後之卷期出處。

### **JoEMLS Editorial Policy**

The *JoEMLS* is an Open Access (OA) Dual, double-blind reviewed and international scholarly journal dedicated to making accessible the results of research across a wide range of Information & Library-related disciplines. The *JoEMLS* invites manuscripts for a professional information & library audience that report empirical, historical, and philosophical research with implications for librarianship or that explore theoretical and practical aspects of the field. Peer-reviewed articles are devoted to studies regarding the field of library science, information science and IT, the book trade and publishing. Subjects on instructional technology and information communication, pertaining to librarianship are also appreciated. The *JoEMLS* encourages interdisciplinary authorship because, although library science is a distinct discipline, it is in the mainstream of information science leading to the future of **InfoLibrary**.

### **Open Access Archiving**

The *JoEMLS*, as a role of “OA green publisher/journal”, provides free access online to all articles and utilizes a form of licensing, similar to Creative Commons Attribution license, that puts minimal restrictions on the use of *JoEMLS*'s articles. The minimal restrictions here in the *JoEMLS* are:

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- (2) publisher's PDF version is the most recommend if self-archiving for postprint is applicable; and
- (3) published source must be acknowledged with citation.

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## EDITORIAL

# Integrity and Vigilance of a Journal Editor

The most shocking news in recent international academic publishing field would be the unexpectedly closing of Scholarly Open Access website in the mid-January of 2017. Although Jeffrey Beall, the key figure of the website, somehow disclosed the academic misconduct and set an example of running journals, he made some unsolved problems for the journal administrators and himself. No matter whether the website is closed forever or not, a scandal has been witnessed by the whole world—the so-called “predatory journal” and a contemporary legendary figure.

In the early January of 2017, Beall issued a black list of 2017 international publishing, including predatory publishers, predatory standalone journals, misleading metrics companies and hijacked journals. Among these, scholars of India are the majority, and unfortunately some scholars of Taiwan are among these too. However, the notorious event and the black list lasting less than a month disappear all together with the closing of Scholarly Open Access website.

Another ironic news of this year drew attention again. On March 22, *Nature.com* published an article titled as “Predatory Journals Recruit Fake Editor”, mentioning some international journals received a job application from a fake figure Dr. Szust and hired her as the editor. The disclosing of this scandal raised a hot debate in the academic field, and most people blame the awful quality of these predatory journals. However, the whole issue is more complicated than this. We should take an objective and rational viewpoint to look at this issue.

Don't easily believe or have a myth in titles of editor-in-chief of so-called “international journals”. It is not supposed to and appropriate to fool or taunt those predatory journals all the time. Some journals are labeled as the notorious “predatory journals”, with an essentially unfair standing point. Now they are treated as baits, becoming so-called “academic papers” that scholars study and publish related articles. This research design is with flaws and against academic ethics. Taking a first look at the resume of Dr. Szust, “she” is truly qualified for journal editors. After the first contact and gaining trust, the candidates' backgrounds should be investigated and verified by the journal before the final decision is made. However, the researcher of the report was eager to make a conclusion and disclose his fake identity afterwards. Isn't this also a fraud in academic ethics? We should be glad that we are not in the list of being set up and taunted. It's highly possible that when this seduction comes to us, we may

not be able to escape this fraud since we are so fascinated with so-called journal “internalization”.

Some academics serve as editors-in-chief or editorial board members in so-called predatory journals. These are usually in-experienced young scholars, but some are sophisticated greedy experienced scholars. So many scholars of Taiwan are fascinated with titles of editorial committee members of “international journals”. Are they ignorant, innocent or with purposes? From another viewpoint, how many new and young journals are wrongly labeled as “predatory journals” because of their creative publishing strategies? Jeffrey Beall casted some shadow. Since the foreign media treated the issue that way, we as their academic peers in Asia should be cautious. The true issue is: between co-authorship and co-editorship without any actual intellectual contributions, which one is worse in terms of academic ethics? If we would like to discuss this issue, we have to treat it as a case and judge it accordingly. When a group of scholars form an academic crime ring, they are as vicious, because these people know it’s hard to sort out the truth, and would keep denying their misconducts. This is unforgivable.

In this issue (Volume 54, Issue 1), five articles are collected; three are research articles, one is a brief communication, and one is an observation report. In the research article part, eleven are rejected, with a rejection rate of 78.5%. Manuscripts published in this issue include “Design and Implementation of a Library and Information Science Open Access Journal Union Catalogue System” by Sinn-Cheng Lin and Ting-Yu Chou, “A Study on Volunteers of the Storytelling of Training in Public Libraries: A Case Study on Volunteer Storytellers of Taipei Public Library” by Yu-Ping Peng and Po-Han Chuang, “Analyses of the Standard Classification of Fields Based on the Directory of Faculty Expertise Open Data” by Sung-Chien Lin. In this issue, in reaction to the well-known Leiden Manifesto, we publish two articles focusing on basic introduction and observation analysis, as well as actual examples of application. We hope to offer a more rational, appropriate and correct viewpoint and value judgment for researchers, academic publishers and academic institutions in an academic climate that emphasizes influence factor (IF) of performance in bibliometrics.

Jeong-You Chiu  
*JoEMLS* Chief Editor



# Design and Implementation of a Library and Information Science Open Access Journal Union Catalogue System

Sinn-Cheng Lin<sup>a\*</sup> Ting-Yu Chou<sup>b</sup>

## Abstract

*Open access is a mode of academic communication that has been on the rise in recent years, but open access academic resources are widely dispersed across the internet, making it occasionally inconvenient in terms of its use. This research is focused on library and information science, using the OAIS reference model as the system framework, two open access platform, DOAJ and E-LIS as the data sources, and through system implementation develop a “library and information science open access journal union catalogue” system. Using the OAI-PMH protocol as the data interoperability standard, and LAMP as the development environment, four major functionalities: ingest, archiving, management and access of information were designed, developed, and integrated into system build. Actual testing and verification showed this system is able to successfully collect data from DOAJ and E-LIS open journal resources related to library and information science. The system is now active and functional, and can be used by researchers in the library and science information field.*

**Keywords:** *Open Access, OAIS reference model, OAI-PMH, Metadata*

## SUMMARY

Open access is a new academic communication mode in recent years, but academic resources for open access are still scattered around the web, thus inconvenient for usages. This study focuses on the subject field of library and information science, adopting OAIS reference model as the system framework, and DOAJ and E-LIS open access directories as the data sources, to develop and implement a Library and Information Science Open Access Journal Union Catalogue System. This system uses Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) protocol as the data interoperability standard, and LAMP (Linux, Apache, MySQL, and PHP) as the development environment, to design and develop a model integrating the four functions of Ingest, Archival, Management and Access. Through empirical testing and verification, this system

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has successfully integrated relevant library and information science open access journal resources in DOAJ and E-LIS directories, and operated smoothly online, providing services for researchers in library and information science.

### **Research Questions**

The research questions of this study are listed below.

1. How to design an Archival Module that regards DOAJ and E-LIS directories as data provider?
2. How to design an Ingest Module that harvests metadata from DOAJ and E-LIS directories?
3. How to design an Access Module for data consumers to harvest metadata from this system?
4. How to design a library and information science open access journal union catalogue system that is convenient for system managers to operate the Management Module?
5. How to integrate the modules mentioned above to develop a comprehensive library and information science open access journal union catalogue system?

### **Research Results**

This system is built under the Linux+Apache environment, using MySQL as the database of stored journal data, and adopting PHP programming language to develop and incorporate the four major modules.

As to the database structure, appropriate data tables and fields are designed for retrieving journal records from DOAJ and E-LIS directories, and for storing metadata of the two different formats.

The first module developed in this study is Ingest Module. When the system receives journal metadata sent from other systems, it should read and analyze the metadata, and then ingest into its database.

The second module developed in this study is Archival Module. After the metadata is ingested into Archival Module, the whole set of archival data including journal article metadata, electronic full text and backup files should be stored into the database for access and retrieval.

The third module developed in this study is Management Module. This module is for coordinating, maintaining and retrieving descriptive and management data. It should allow users such as researchers or journal publishers to register, and then determine different users' management authorities, for managing the metadata of journal articles.

The fourth module developed in this study is Retrieval Module. When receiving retrieval requests through OAI-PMH commands from other systems,

this module should retrieve data from its journal databases, and transcribe the data into packets in a format in accordance with OAI-PMH protocol, for the final delivery.

After developing the database and the four major modules, we incorporate and build up a simulation system, and successfully tested and verified that this system meets the requirements of the OAI reference model, OAI-PMH standards, DOAJ and DC metadata formats.

## Conclusions

In this study we develop a library and information science open access journal union catalogue system using the OAI reference model, taking into consideration of the needs of information producers, managers, information consumers, and archival systems. Four major modules are developed and incorporated into an operating system. The conclusions are discussed below according to our research questions.

1. The design of the database structure of Archival Module should meet the requirements of metadata formats of DOAJ and E-LIS directories.

Since DOAJ and E-LIS adopt different metadata formats, the design of data tables and fields should take into consideration of the differences to design tables and fields that accommodate metadata of both DOAJ and E-LIS directories.

2. The design of the analyzer of Ingest Module should take into consideration of both syntax and semantics of XML tags.

Since there are partial differences in the transcribing methods of XML tags between DOAJ and E-LIS directories, the formats of transcribed metadata are also different, thus there should be two analyzers designed for each directory, for correctly ingesting the metadata into the corresponding tables and fields.

3. The Retrieval Module should read OAI-PMH commands, pack the data into XML format, and control the data flow.

The Retrieval Model reads OAI-PMH commands and responds with corresponding metadata formats; information consumers can also specify package formats of metadata they need. In addition, this module can control the data flow with Resumption Tokens.

4. The design of Management Module should consider assisting managers in managing the system.

The Management Module provides managers with services including changing passwords and system data, base URL of data provider, managing email accounts, and time interval of data harvesting. The module can also timely provide statistic reports of incomplete metadata, for managers to control data quality.

5. This system can be incorporated according to the OAI reference model.

According to the OAIS reference model, we incorporate modules of Ingest, Archival, Management and Retrieval to develop and implement a system. The validating results indicate this system meets the relevant requirements.

Although this study discusses applications of a system development, it serves as the basic foundation for future studies, such as analyzing big data of the open access journals.

### **ROMANIZED & TRANSLATED NOTES FOR ORIGINAL TEXT**

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# JoEMLS English Summary



# A Study on Volunteers of the Storytelling of Training in Public Libraries: A Case Study on Volunteer Storytellers of Taipei Public Library

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## Abstract

*In recent years, the administrators of public library administrators have been ctively promoting children's reading services. In particular, storytelling activities have a significantly positive effect on enhancing children's interest and ability in reading. Because of human resource shortages at public libraries, providing these services depends on volunteers. The public libraries should enhance the competencies of volunteers who engage in storytelling, and provide appropriate training for maintaining as well as improving the effectiveness of storytelling services. Therefore, this study was conducted to examine the storytelling training of storytelling volunteers. The study used in-depth interviews to obtain information on the experiences, ideas, and suggestions of public library storytelling volunteers at Taipei Public Library. Current education and training of storytelling volunteer encompasses demand analysis, implementation methods, course content, assessment of effectiveness, and suggestions for adjusting education and training in public library. Finally, the present study results are provided for education and training of storytelling volunteers for public libraries.*

**Keywords:** Public Library, Volunteer, Storytelling, Education and training

## SUMMARY

In recent years, public libraries have begun to routinely recruit storytelling volunteers (Powe, 2007; Williams, 2007); it is obvious that library administrators have to evaluate skills, knowledge and suitability of volunteers, for making sure these volunteers could execute storytelling activities that meet the administrators' requirements (McDiarmid & Auster, 2005). Pulic libraries should provide educational training to storytelling volunteers, and support volunteers to provide storytelling services to children (Sherman, 1998). Taking a general look at previous literature on library volunteers, we can see that most studies discuss management, disadvantages and merits of storytelling volunteer services from

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the viewpoint of library administrators (Bartlet, 2013; Driggers & Eileen, 2011; Nicol & Johnson, 2008; Todaro & Smith, 2006), and almost none focuses on the volunteer part to discuss problems of library management issues. A few studies discuss educational training issues of public library storytelling volunteers, but focus on describing concepts and theories; empirical studies have rarely been done so far (Morris, 2006; Nicol & Johnson, 2008). Therefore, in this study we adopt the qualitative in-depth interview approach to explore the current situation of educational training and needs of public library storytelling volunteers from the volunteers' viewpoint. The aspects of interviews include need assessment, implementation approaches, instructional content, outcome evaluation, and suggestions for adjustments. The research results provide references for educational training of public library storytelling volunteers and implementation of storytelling activities, thus hopefully to help enhance the quality of public library storytelling services.

### **Literature Review**

Children's reading rooms of public libraries are the best place for children and their families and friends to develop reading interests, such as discovering and reading picture books (Liu, Ito, Toyokuni, Sato, & Nakashima, 2012; Stooke & McKenzie, 2009). Public libraries provide storytelling hours to promote and support reading literacy, making storytelling an important activity of public library services to children (Farmer, 2004; Steele, 2001). However, most libraries have insufficient personnels, resources and time. That is why volunteer services are so important in helping libraries continually provide free and quality readers' services, and expand libraries' functions of promoting community education, leisure and culture (Hughes-Hassell, Agosto, & Sun, 2007; Powe, 2007; Williams, 2007). In Taiwan, many public libraries have provided storytelling activities for years, and even set up special teams of storytelling volunteers. Among these, Volunteer Storyteller of Taipei Library is the earliest in Taiwan to set up a volunteer team and provide storytelling services to children since 1987.

Quality volunteer projects require special educational training (Childs & Bowers, 1997). Storytellers need to continually advance themselves to maintain fresh fun of storytelling activities, and thus make children look forward to listening to storytelling in libraries (Dorothy, Elaine, Connie, & Gilda, 2010; Morris, 2006). A complete training program can be divided into steps including need analysis, training design, training implementation, and training outcome evaluation. According to purposes and implementation time, a training program can also be categorized into orientation training and on-job training, and implementation approaches include keynote speeches, group discussions,

field trips, assigned readings, and conferences and seminars (Heinich, Molenda, Russell, & Smaldino, 2002). Steps of recruitment and training of volunteer storytellers of Tapei Library include recruitment, selection, educational training, observation, trial internship, formal services, and supervision and evaluation.

## **Research Design and Implementation**

In this study, we focus on Volunteer Storyteller of Taipei Library as the study subject, and adopt the semi-structured in-depth interview approach to interview 15 volunteer storytellers. The researchers of this study conduct a content analysis on the interview transcripts, and discuss research results according to analysis contents and coding categories. We also employ member checking to make sure the liability and accuracy of data.

## **Research Results and Analysis**

### **1. Need assessment**

The training program should take consideration of needs of those senior volunteers who have served for a long time and would like to go on advancing themselves, and keep updating and enhancing the breadth and depth of instruction sessions.

### **2. Implementation approach**

Implementation approaches can be categorized into instructor selection and recruitment, types (orientation training, on-job training, management and development training), and degree of learner participation.

### **3. Instructional content**

Instructional content can be categorized into knowledge about reader groups, story materials, story performance, extended activities, and information technologies.

### **4. Outcome evaluation**

A satisfaction survey has been done on libraries and the volunteer team after the instruction sessions to understand learners' opinions and suggestions for the sessions, for the reference of designing future sessions. Many reporters report that they have learned and be amazed at many helpful skills knowledge about storytelling, such as selection and analysis of picture books, and oral and body movement communication.

### **5. Suggestions for adjustment**

The interviewed volunteers provide opinions and suggestions according to instructional contents, their own learning experiences, and their awareness of insufficient knowledge and skills. The suggestions can be categorized into knowledge about reader groups, story materials, story performance, extended



activities, and information technologies.

### **6. General analysis**

Many interviewees report that although most educational training programs on story materials, communication and extended activities have continued for years, they still need to be enhanced or advanced. The programs should be reinforced with instructions on application of digital and online resources, as well as updated and enhanced knowledge and application of information technologies. Some programs have not yet provided training sessions, but might need to start for meeting the trend. It is hoped that they provide training sessions of greater variety.

## **Conclusions and Suggestions**

This study investigates the current situation of Volunteer Storytellers of Taipei Library, including need assessment, implementation approaches, instructional contents, outcome evaluation, and suggestions for adjustments. The results can serve as reference for public libraries when they are making strategies of and implementing educational training programs for volunteer storytellers. Generally speaking, most volunteer storytellers have a positive view toward the educational training program provided by the library and the volunteer team, but they also report that it needs some improvement and adjustments. The implementation approaches of educational training programs need variety and enrichment, incorporating theories and practices; if educational sessions allow learners to highly participate, learners tend to develop higher learning interests. Suggestions for adjustments of instructional content can be categorized into knowledge about reader groups, story materials, story performance, extended activities, and information technologies. The overall outcome evaluation is satisfying, but volunteers report that the instructions still needs greater variety and advancement. Suggestions for adjustments are offered below.

1. Libraries should understand volunteers' needs for educational training, and develop a curriculum of greater variety and enrichment.
2. Libraries should offer instructional sessions of different levels of difficulty, for senior volunteers to be willing to continually participate.
3. Libraries should add instructional sessions of electronic resources and information technologies related to services to children, for volunteers to incorporate the knowledge and skills into storytelling.

### **ROMANIZED & TRANSLATED REFERENCE FOR ORIGINAL TEXT**

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# Analyses of the Standard Classification of Fields Based on the Directory of Faculty Expertise Open Data

Sung-Chien Lin

## Abstract

*This paper presents a series of analyses of the Standard Classification of Fields which was applied to the classification of all departments in universities based on measuring similarity between text data of the faculty expertise directory from open data provided by the Ministry of Education of Taiwan, and suggests some possible directions for improvement of the directory and the classification system. The analysis techniques included the Word2Vec text matching technique to estimate the similarity of faculty expertise, the methods to expose properties of the classification system such as hierarchical clustering analysis, multidimensional scaling analysis, silhouette testing, distribution of fields with similar expertise set, and statistics of the similarity between departments, and a variety of information visualizations to illustrate the analysis results. The results of this study show that in order to meet requirements from educational statistics, policy making, and academic exchanges, the organization structure, organization scheme, and data quality of the Standard Classification of Fields should be improved.*

**Keywords:** *The Standard Classification of Field, Open data, The Directory of Faculty Expertise, Silhouette test, Word2Vec*

## SUMMARY

The Ministry of Education of Taiwan collects academic expertise of all faculty members in universities in Taiwan and publishes a Directory of Faculty Expertise every year for higher education system statistics. In the directories, each department in the universities is assigned to a broad field (BF), a narrow field (NF), and a detailed field (DF) according to a hierarchical classification system which is a modified version of the International Standard Classification of Education (ISCED 1997) developed by the UNESCO. The field assignment of a department mainly depends on the title and the subjects taught by the department (Ministry of Education, 2007). The aim of this study is to suggest some possible directions for improvement of the directory and the classification system. Thus we performed a series of analyses on the classification system based on the

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assumption that the expertise data of a department can represent its subjects and the text of expertise data of the departments in the same field should be more similar to each other than those of departments in the other fields.

(1) We analyzed the relationships and clusters among all of the NFs in the classification system and then compared the results with the BFs which the NFs originally belonged to.

(2) We evaluated the coherence for all NFs based on the similarities between expertise data of the departments and visually presented the confusing NFs.

(3) We identified the departments that had expertise data that were less similar to those of many other departments in the same NF and explored the reasons why they were incoherent to others.

The faculty expertise directory used in this study was the version made available in 2014 (<http://data.gov.tw/node/27931>). The total number of the records in the directory was 93,368. However, those records from part-time faculty members, lacking field information, or displaying “None” as their expertise data were excluded. As a result, we analyzed 43,460 records from 3,233 departments, which included 8 BFs, 22 NFs, and 148 DFs in addition to the “Others” field.

Before analyzing the Directory of Faculty Expertise classification system, we estimated the similarity between the expertise data using a technique of artificial neural networks, Word2Vec. It was proposed by Mikolov, Chen, Corrado, & Dean (2013). The technique of Word2Vec can transfer all terms occurred in text of the input data into feature vectors which preserved the syntactic and semantic characteristics of the terms. Since most of the expertise data used in this study were provided in Chinese, we used Chinese characters instead of Chinese words as the Word2Vec input unit due to the difficulty of Chinese word segmentation, particularly when it is applied to the expertise data full of technical terms. The vectors for representing departments were generated by summed up all the corresponding feature vectors of all Chinese characters, English terms, and numerical values appearing in the expertise data of the departments. Moreover, a vector for a NF was generated by averaging the vectors of the departments assigned to it. The similarity of expertise data between two departments or two NFs were then measured with the cosine value between the two corresponding vectors.

We used the techniques of cluster analysis and multi-dimensional scaling to reveal the relationships and clusters among NFs. The results of cluster analysis showed that all NFs were divided into 3 groups. There were some BFs with NFs that were all clustered in the same groups. For example, the two NFs of the BF “Agriculture” both located in the first group, all of the NFs in the BF “Engineering” located in the second group, and the NFs of the BFs “Humanities and Arts” and

“Social Sciences, Business and Law” were all in the third group. However, the NFs of the remainder BFs were split into different groups. The NFs in the same groups as the results of the cluster analysis were usually mapped into the positions close to each other based the results of multi-dimensional scaling. Moreover, there was an obvious separation between the first group of NFs and the other two groups, but the second and the third group were overlapped with each other. The overlay were caused by that the expertise data of the NFs “Architecture and Urban Planning” and “Design”, respectively in the second and third groups, were very similar. In addition, the expertise of computers had become common for a few NFs in the third group, which originally was unique to the NF “Computer” in the second group.

The coherence of NFs was evaluated using the silhouette test (C. Chen, Ibekwe-SanJuan, & Hou, 2010; Rousseeuw, 1987) based on the similarities among the expertise data of departments. Firstly, the silhouette score of each department was estimated. Silhouette scores are between 1 and -1. If a department had a higher positive silhouette score, it indicated that the department was more consistent with its assigned NF. Then, the degree of coherence for an NF was obtained by averaging the silhouette scores of all departments assigned to it (Janssens, Zhang, De Moor, & Glänzel, 2009). In this study, the results of coherence evaluation were less than satisfactory. The averaging silhouette scores of many NFs were negative values. In other words, in these NFs there were a lot of departments of which the expertise data were more similar to those of departments in the other NFs. Therefore, these NFs were easy to be confused with other NFs. We generated a heatmap to observe the confusion among NFs. The heatmap showed that the confusing NFs of an NF and the NF itself were usually observed in the same group based the results of cluster analysis. For example, the NFs “Veterinary” and “Life Sciences” were both of the confusing NFs of “Medicine” and these three NFs were all members in the first group.

Finally, we selected departments with the highest numbers of similarities that were lower than a pre-setting threshold and considered that they were inconsistent to their own NFs. In this study, the NF that had the highest number of similarities lower than the threshold was “Business and Administration”, followed by “Transport Services”, “Life Science”, and “Mathematics and Statistics”. In addition to having more unique expertise than other departments in the same NFs, the reasons for the departments being inconsistent are that the numbers of faculty members in those departments were too small, the format and the language used in the expertise data of the departments were very different, or the departments were set up for interdisciplinary learning and thus their expertise were related to many NFs.

In view of the results above, we present the following discussions and suggestions on the classification system of fields, the quality of open data, and further research.

First, the classification system of the current directory utilizes the academic subjects of the departments as the directory organization scheme. Thus the determination of the subjects of a department is based on the title. The results of this study has confirmed the feasibility of using the similarity of expertise data to analyze the classification system. It is desired to improve the precision of similarity estimation between expertise data and then to apply the estimation method to the organization scheme of the next classification system.

In addition, the current classification system also utilizes a top-down, hierarchical organizational structure and therefore the fields do not overlap with each other. But it is difficult to assign an appropriate and unique field to the departments with interdisciplinary background. A multi-label classification system is possible to fully express the diversity of subjects in those departments because it has a complex and flexible organizational structure. However, its complexity and flexibility also makes a larger cognitive load for users and it can be difficult for them to form a cognitive structure about the entire system. Therefore, it is necessary to carefully consider the feasibility of applying the multi-label classification system to the directory of faculty expertise.

According to lessons learned from the analysis process and the results, the quality of open data is worth more attention. The Ministry of Education is recommended to develop and provide guidelines and examples for data providers and check the format and contents of data to reduce possible errors. Moreover, it is possible to develop text processing techniques that can help prepare data or detect errors to decrease the burdens on data administrators and providers and improve the data quality.

The possible extensions of this study include further performance analysis of applying the Word2Vec technique to text similarity estimation and the study of multi-label classification focusing on the problems caused by the departments with interdisciplinary background. Using words or characters as input units or different length of context both affect the Word2Vec performance and it is worth further analysis to obtain better results. Comparison of the traditional TF-IDF approach and the Word2Vec is also needed. Developing and evaluating a multi-label classification system are still very challenging.

#### ***ROMANIZED & TRANSLATED REFERENCE FOR ORIGINAL TEXT***

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JoEMLS English Summary



# How the Existence of a Regional Bibliographic Information System can Help Evaluators to Conform to the Principles of the Leiden Manifesto

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## Abstract

*It is shown that the use of Flanders' regional bibliographic information system in a performance-based research funding system corresponds to a large extent with the principles of the Leiden Manifesto. Yet, it is argued that there is still room for improvement. We offer this Flemish perspective on the Leiden Manifesto as a suggestion to colleagues worldwide to compare their local bibliographic information systems with the principles set forth in the Leiden Manifesto.*

**Keywords:** *Leiden manifesto, Regional bibliographic information system, Flanders, Research evaluation, Performance-based research funding*

## Introduction

In April 2015 *Nature* published a comment by Diana Hicks, Paul Wouters, Ludo Waltman, Sarah de Rijcke and Ismael Rafols entitled: **The Leiden Manifesto for research metrics**. The authors express their concern about current research evaluations in academia “led by the data rather than by judgement” and a proliferation of metrics in evaluation contexts that are “usually well intentioned, not always well informed, often ill applied” (Hicks, Wouters, Waltman, de Rijcke, & Rafols, 2015). They then present a guideline consisting of ten principles on the proper use of research metrics for evaluation.

The contents of the Leiden Manifesto (LM) are not entirely new. Some of the principles have been proposed before, by bibliometricians (Glänzel & Wouters, 2013) or by academic research communities themselves, e.g., in the San Francisco Declaration On Research Assessment (DORA, 2012; <http://www.ascb.org/dora/>). First and foremost, according to the LM, evaluations in academia

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should take into account the many idiosyncrasies of academic research. This means that metrics should only be used if they can accurately measure fulfillment of the specific research goals of institutions, groups or individuals. From this it follows that indicators should be scrutinized and improved on a regular basis, and that their use by evaluators should steer clear of false precision. Qualitative peer assessment should take up a central position in research evaluation, with research metrics only used in a supportive role. Finally, policy makers and evaluators should explicitly acknowledge the systemic, possibly behavior-altering effect of assessments and indicators (Hicks et al., 2015).

Though the Leiden Manifesto has been extensively discussed in the bibliometric research community, see e.g., (Bornmann & Haunschild, 2016; David & Frangopol, 2015), it remains unclear how extensive its impact has been on evaluators and evaluation practices worldwide. In the present paper we aim to contribute to the discussion by reflecting on current research evaluation practices and a main research funding mechanism in Flanders, the Northern Dutch-language part of Belgium. For this we use as a guideline the ten principles outlined in the LM (in a rearranged order). We hope that a discussion of the Flemish case can further encourage researchers and evaluators in other countries to reflect on their own situation and systems.

In our discussion, we do not limit ourselves to ex-post research evaluations (Section 2) as explicitly mentioned in the LM, but will also focus on the performance-based research funding system (PRFS) for the five universities in Flanders. The motivation for doing this is inspired by the Leiden Manifesto itself, when it states:

**Principle 9: Recognize the systemic effects of assessment and indicators**

The systemic effect of assessments and indicators goes beyond explicit evaluations of researchers' performance in formal evaluation exercises. "Implicit evaluations" can also be present in the trickle-down incentives created by indicator-reliant PRFS's at the national or regional level (Hicks, 2012). For this reason, we believe that the Flemish funding system for universities, which makes use of publication metrics in its calculations, merits the same critical discussion from the perspective of the Leiden Manifesto. We discuss the Flemish funding system for universities and its use of research metrics mainly in Section 3.

### **Research Evaluation in Flanders**

In Flanders, the ex-post type of research evaluation is not conducted region-wide in the form of an evaluative research assessment exercise coupled to research funding, along the lines of the well-known model of the United Kingdom's Research Excellence Framework (REF) and its precursor the Research Assessment Exercise (RAE; Broadbent, 2010; Martin, 2011). Instead, calculation

of research funding for the five Flemish universities is achieved without formal evaluation, but by the yearly application of an indicator combining input and output factors, the latter containing a bibliometric component. Section 3 below discusses the Flemish funding model more in detail.

Explicit ex-post evaluation of Flemish university departments closely follows the Dutch model of the Standard Evaluation Protocol (SEP) focusing on formative goals, such as encouraging organizational learning and identifying research potential (Hansson, 2010; Rons, De Bruyn, & Cornelis, 2008; Westerheijden, 1997). The benefits of such a system over one focusing on evaluative goals have been described as leaving more room for remediation and improvement because the implications of assessments are not prefixed in monetary terms and because the actual units of assessment are small, namely research groups or centers rather than departments (Engels, Goos, Dexters, & Spruyt, 2013; Westerheijden, 1997). In practice, all research at Flemish universities (groups or centers constituting departments) is assessed in a cycle of eight years. The evaluation is conducted by panels composed of experts mainly affiliated to foreign universities. Typically, the expert panel is provided with all relevant documentation regarding the research groups by the university administration in close collaboration with the research groups themselves. This includes a description of the research agenda, the composition of the group, a profile of the tenured academic staff in the group, an overview of the funding acquired, publications and bibliometric indicators, supervised PhDs, invited lectures, and other scientific activities illustrating the performance of each of the groups (Engels et al., 2013). Clearly, quantitative information including bibliometrics serves to inform expert panel opinion, as prescribed by the Leiden Manifesto:

**Principle 1: Quantitative evaluation should support qualitative, expert assessment**

In short, in research evaluations of Flemish university departments the use of metrics does not stand alone, and certainly does not take the place of qualitative expert assessment. Furthermore, to the best of our knowledge, there exist no plans at Flemish universities to replace qualitative assessment by a sole reliance on research metrics. At the international level as well, the debate about bibliometric indicators being able to replace expert opinion is focused on the other type of evaluation, that of the nation-wide evaluative assessment exercise (Abramo & D'Angelo, 2011; Butler & McAllister, 2011). By contrast, there exists little appetite for questioning the added value of expert peer opinion used by the formative evaluation type.

Finally, as far as evaluating the individuals composing research groups or centers goes, peer evaluations in Flanders (and the Netherlands) also seem largely



congruent with another, closely related principle of the Leiden Manifesto:

**Principle 7: Base assessment of individual researchers on a qualitative judgement of their portfolios**

To summarize Section 2, the explicit evaluation of academic research performance in Flanders seems well in line with the principles of the Leiden Manifesto on the proper use of research metrics. Qualitative expert opinion takes center stage; metrics are used only in a supportive role.

### **Performance-based Research Funding in Flanders**

The situation regarding performance-based research funding (PRFS) in Flanders and its congruence with the Leiden Manifesto is more complex. Already in the introduction we have argued that PRFS's and the incentive structures they create can be seen as an implicit form of research evaluation; if translated to institutional policies regarding for instance promotions, PRFS's seem likely to have systemic effects on research and publication preferences. Several recent papers have analyzed and discussed the possible impacts of PRFS on researchers' behavior in various countries (Aagaard, Bloch, & Schneider, 2015; Bloch & Schneider, 2016; Butler, 2003a, 2003b; Guns & Engels, 2016; Hammarfelt & de Rijcke, 2015; Ossenblok, Engels, & Sivertsen, 2012).

In this section, we summarize the main traits of the Flemish funding model for the universities and its use of research output metrics, and discuss them in the light of the caveats formulated by the Leiden Manifesto.

#### **1. Congruence with the Leiden Manifesto**

The current Flemish funding model for academic research originated in the near complete devolution of science and educational policy by the federal government in Belgium to the Flemish and Walloon regions, starting in 1988. During this process, which continues to this day, Flanders has opted to largely redesign the previous federal funding model for universities, which was traditionally mainly built on input variables. Instead, Flanders has shifted its own competitive funding model more and more towards the inclusion of research output metrics (Debackere & Glänzel, 2004; Spruyt & Engels, 2013; Verleysen, Ghesquière, & Engels, 2014).

Funding for the universities currently consist of four components: (1) a block grant for academic education, research, and the provision of services to society, (2) parallel government financing for basic research (amongst which is included the University Research Fund (**Bijzonder Onderzoeksfonds** or **BOF**)), (3) other financing sources for research (e.g., the European Union), and (4) third party financing of university contract research. For the development of the five universities' respective research policies for basic research, the BOF in particular

has been an important asset. In 2016 the BOF accounted for some 150 million euro, distributed over the five universities (Antwerp, Brussels, Ghent, Hasselt and Leuven). Over the years, the BOF key has also become the standard distribution key for additional funding mechanisms for university research, making its overall leverage significantly larger (Verleysen et al., 2014).

Especially from 2003 onwards, the Flemish government has opted to give the allocation of research funding by means of the BOF a strongly competitive character. Consequently, the distribution of funding over universities has henceforth been increasingly determined by their respective share in the total of publications and citations (Debackere & Glänzel, 2004).

The growing orientation towards performance-based funding in Flanders intended to reward the quality of the research performed. In this early stage of the funding model (2003-2008) “quality” was conceptualized by the government as the publication of articles, letters, notes, or reviews in high-level outlets indexed in the Science Citation Index Expanded (SCIE) of the Web of Science (WoS). This specific output per university was used as a proxy for their total share in “quality publishing.”

In evaluating the adequateness of this first crude indicator in Flanders, the Leiden Manifesto provides guidance:

**Principle 2: Measure performance against the research mission of the institution, group or researcher**

An obvious problem with the earliest incarnation of the BOF-key was its neglect of the specificity of the research and publication traditions of a large range of fields, especially in the social sciences and humanities (SSH), which are poorly represented in the SCIE database. Unsurprisingly, this way of counting for the BOF without taking SSH publications into account was met with strong criticism by various communities of SSH scholars in Flanders. As a consequence, in 2008, the Flemish government amended the BOF-regulation, and decided to henceforth also include in the funding model all publications by Flemish affiliated researchers indexed in the Social Science Citation Index (SSCI), the Arts and Humanities Citation Index (AHCI) and the Conference Proceedings Citation Indexes (CPCI-S and CPCI-SSH). Mainly due to the still relatively poor coverage by these WoS-databases for the SSH in non-Anglophone countries or regions like Flanders, it was also decided to initiate the construction of a separate bibliographic database for the comprehensive registration and inclusion in the funding model of all other peer reviewed publications in the SSH authored by researchers affiliated with a Flemish university. This is the **Flemish Academic Bibliographic Database for the Social Sciences and Humanities** (or VABB-SHW), which became operational in 2010.

Seen from the perspective of the Leiden Manifesto, these changes to the funding model were definitely good practice. Apart from better satisfying the requirements of the abovementioned Principle 2 regarding the measurement of performance against the research missions of institutions, groups or individuals, the amendments to the BOF-regulation of 2008 also complied with.

### **Principle 10: Scrutinize indicators regularly and update them**

Indeed, the primary goal of restructuring the BOF-key and building the VABB-SHW was to henceforth include in the funding model an SSH-specific publication parameter. By setting up a legal framework for the VABB-SHW, the Flemish government explicitly recognized that publication cultures in the SSH differ greatly from those in the natural, technical and biomedical sciences. In its latest revision of the parameters of the BOF-key (21/12/2012) the government decided to increase the weight of the VABB-SHW to 6.80% as of 2016 (Spruyt & Engels, 2013).

In practice, the VABB-SHW has retrospectively and comprehensively collected bibliographic references dating back to the year 2000 of peer reviewed publications by SSH scholars affiliated with one or more of the five Flemish universities. In accordance with the stipulations of the BOF-regulation, the following five publication types are eligible for inclusion in the VABB-SHW: (1) articles in journals, (2) monographs, (3) edited books, (4) chapters (articles) in books, and (5) proceedings papers not part of special issues of journals or of edited books. In Flanders, as elsewhere, in many SSH fields of research the publication of monographs, edited books or book chapters is ubiquitous (Giménez-Toledo et al., 2016; Verleysen, 2016). Their inclusion in the funding model through the VABB-SHW therefore was a seminal step towards compliance with another central Leiden principle:

### **Principle 6: Account for variations by field in publication and citation practices**

Equally important from this perspective was the inclusion of publications in the VABB-SHW irrespective of their publication language. In Flemish SSH research as a whole, publications in other languages than English (mostly Dutch, the main language in Flanders) still account for about 25% of total output. Especially in disciplines belonging to the humanities, this share easily reaches 40% or more (Ossenblok, 2016). Language use in publications is evidently related to the targeting of specific, also non-academic readerships by SSH scholars, who frequently study topics with local societal or cultural relevance, and therefore publish a sizeable share of their output in the local language (Verleysen & Engels, 2014). By including publications of all standard types and in all languages, the VABB-SHW again rates well seen from the perspective of the LM.

### **Principle 3: Protect excellence in locally relevant research**

The protection of locally meaningful research was further advanced by the creation of a quality label for individual peer-reviewed books in 2012, the GPRC-label (**Guaranteed Peer Reviewed Content**). During the first few years of the VABB-SHW's existence, book publications were only eligible for inclusion in the VABB-SHW and the funding model if their publishers were included in a selective list of academic publishers conducting credible peer review for their whole portfolio. With the creation of the GPRC-label, all locally published and peer reviewed books of a high academic standard are now eligible for inclusion in the database and funding model (Giménez-Toledo et al., 2016; Verleysen & Engels, 2013). Of course, SSH scholars in Flanders also continue to publish non-peer reviewed material not included in the VABB-SHW with a local societal and cultural relevance.

### **Principle 4: Keep data collection and analytical processes open, transparent and simple**

Another sound element of the Flemish system is its relative simplicity of data collection and the transparency of procedures involved in calculation of the BOF-key.

The publicly available BOF-regulation (<http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=14492>) lists a number of basic criteria which outputs eligible for inclusion in the VABB-SHW need to meet: (1) to be publicly accessible, (2) to be unambiguously identifiable by an ISBN or an ISSN number, (3) to make a contribution to the development of new insights or to applications resulting from these insights, (4) to have been subjected - prior to publication - to a demonstrable independent peer review process by scholars who are experts in the (sub)field of the publication. Peer review must be carried out by an editorial board, a permanent reading committee, external referees or by a combination of these (Verleysen et al., 2014).

Through the BOF-regulation, the Flemish government also decided to entrust the data collection, coordination and technical construction of the VABB-SHW to the Antwerp branch of the interuniversity Centre for Research and Development Monitoring (**Expertisecentrum Onderzoek en Ontwikkelingsmonitoring** or ECOOM). Yearly, the five Flemish universities provide ECOOM-Antwerp with bibliographic information of the SSH publications by their researchers that appeared in the previous two years. Simultaneously it was decided to establish an Authoritative Panel (**Gezaghebbend Panel** or GP), which is composed of 18 professors affiliated with Flemish universities, whose expertise covers the main SSH disciplines. It is the task of the GP, assisted by disciplinary panels, to evaluate which of the journals and book publishers, with whom researchers

affiliated with a Flemish university have published at least once in the retrospective 10-year sliding time window used for the BOF-key, meet the four aforementioned criteria. The work of the GP results in a selection of approved and non-approved publication channels (journals and publishers), thereafter used by ECOOM-Antwerp to filter the complete publication lists submitted by the universities. As is the case for publications in scientific, technical and biomedical fields, and in accordance with the BOF-regulation all WoS-indexed articles, letters, proceedings papers and reviews as well as their citations automatically contribute to the calculation of the BOF-key. In a final stage of the yearly cycle, the update of the database as well as the calculation of the BOF-key for the new funding year is thoroughly checked and validated by each university (Verleysen et al., 2014).

### **Principle 8: Avoid misplaced concreteness and false precision**

Making use of a bibliometric indicator, the Flemish funding model decides on (a share of) research funding at the level of the universities. This implies that only aggregated data are used; the government does not calculate the productivity or general performance of separate departments, let alone research groups or individual researchers. As such, the Flemish model largely avoids the false precision of some evaluation and funding systems directed at lower levels, rightly criticized both by the LM and other guidelines for the proper use of bibliometrics (Glänzel & Wouters, 2013).

### **Principle 5: Allow those evaluated to verify data and analysis**

Urging for transparency is an important focus throughout the LM. This also relates to giving institutions and individuals the means to check the correctness of output metrics and their subsequent use in the calculation of funding. Here as well, the Flemish funding model and its implementation in the VABB-SHW score well. As mentioned, the VABB-SHW data is yearly checked by the research administrations of the five universities, which are free to request additions or corrections. A standardized and transparent appeal procedure is also in place, minimizing the chance of erroneous omissions of publications from the VABB-SHW. The database can also be searched online (<https://www.ecoom.be/en/services/vabb>).

### **2. Incongruence with the Leiden Manifesto**

Although the current Flemish funding model for the universities and its use of the VABB-SHW database seems largely compliant with a number of principles outlined in the Leiden manifesto, there is still room for improvement.

Historically, as we have outlined in the preceding section, the early version of the Flemish PRFS was at least partially incongruent with **Principle 2**

**(Measure performance against the research mission of the institution, group or researcher)**, as no specific publication parameter for research in the SSH was included at the time. This points to the more general problem of the need for thorough consultation of the research communities to be evaluated or funded by such models. In contrast to for instance Norway, in the case of Flanders the implementation of the PRFS from 2003 onwards, as well as its changes thereafter, were not preceded by a broad consultation of the academic research communities. Undoubtedly, this contributed to a disputed legitimacy of the system in its early years. However, although no broad consultation took place, the government has in fact left the discussion for managing and changing the funding model to the five universities, which are free to suggest changes to the system or to organize their own consultations of researchers.

In 2008 the problem of legitimacy was further addressed by the revision of the BOF-key (Verleysen et al., 2014). However, elements of the current system to this day reflect to some degree the historical top-down decision making in shaping the Flemish PRFS. One example is the weighting of publication types used in the VABB-SHW and the calculation of the BOF-key. The government, advised by an ad hoc working group installed by the universities' presidents conference, may have made an informed decision on these weights (1 for articles, edited books and book chapters; 4 for monographs; 0.5 for conference proceedings), but no prior broad consultation of researchers was held to corroborate their validity, e.g., across fields of research (**Principle 6: Account for variations by field in publication and citation practices**). The impact of using these weights is probably mitigated by the official sole use of the bibliometric indicator at the institutional level. However, the possible trickle-down effect such incentives could have at lower aggregation levels of Flemish university research should be, if acting upon the LM guidelines, more thoroughly studied, and taken into account for future policy making (see also below, Section 4).

A similar problem of the further weighting of journal articles exists in the use in the Flemish funding model of the Journal Impact Factor (JIF). Articles in journals with a high JIF account for more points (i.e., funding) than ones with a low or without JIF. The use of the JIF as a bibliometric indicator has been widely criticized by both research communities and bibliometricians, not in the least because of its underlying highly skewed article citation distributions (Seglen, 1992). An improvement to the Flemish model was implemented in 2013, when JIF's were henceforth binned per field of research into twentieths.

A more serious and still not remedied issue is the undifferentiated counting of citations (that is, citations of the WoS-indexed publications taken into account for the BOF-key by WoS-indexed publications (any of them)). At the moment no

weighting of citations is used to account for variations in citation patterns across fields of research. Given that citations account for 16.6 % of the BOF-key, the impact of this way of counting on funding is probably considerable.

Notwithstanding the official sole use of the BOF-key at the institutional level, the use of the JIF in the bibliometric indicator, and even more so the undifferentiated counting of citations, do not seem compliant with **Principle 8 (Avoid misplaced concreteness and false precision)** as well as **Principle 2 (Measure performance against the research mission of the institution, group or researcher)** and **Principle 6 (Account for variations by field in publication and citation practices)**.

Both the relatively limited consultation of academic stakeholders in the creation of the Flemish funding model, as well as specific elements of its bibliometric indicator, point to what is probably one of the most fundamental principles of the Leiden Manifesto:

#### **Principle 9: Recognize the systemic effects of assessment and indicators**

Although the debate on whether PRFS's actually have an impact on publication behavior continues to this day (see introduction to Section 3), and no concluding evidence has been presented yet, the mere fact that such systems could possibly have a deep impact on academic research and publication cultures, should, according to the LM guidelines, be sufficient reason for caution in policy making on academic assessments.

### **Conclusion**

Using as a guideline the ten principles of the **Leiden Manifesto for research metrics** (bibliometrics) we have discussed both ex-post research evaluation practices as well as performance-based research funding for the universities in Flanders, Belgium.

Research evaluations of university departments in Flanders are based on the Dutch **Standard Evaluation Protocol** (SEP) and seem largely congruent with the ten principles of the Leiden Manifesto. Seen from the ten principles the use of bibliometrics in the Flemish funding model for the universities (BOF-key) and its regional bibliographic database for the social sciences and humanities (VABB-SHW) has clearly made progress during the past decade towards a greater compliance. Performance-based research funding in Flanders is organized at the aggregation level of universities, takes into account several of the variations in publication and citation practices between fields of research, and also seeks to protect excellence in local research. From an organizational point of view, the relative transparency of data collection and validation procedures are noteworthy as well.

Confronted with the **Leiden Manifesto** the use of bibliometrics in the current Flemish funding model for the universities still leaves room for improvement. We have pointed out how the Flemish funding model has evolved without much explicit or systematic consultation of the various academic research communities in Flanders. Some elements of the bibliometric indicator can also be seen as arbitrary and/or problematic, e.g., the undifferentiated counting of citations.

For the future, a more thorough consultation of research communities and the continuing transparency of communication in the further development of the Flemish funding model and its use of bibliometrics would be in line with the Leiden Manifesto. As more evidence on the possible systemic effects of research evaluation practices and performance-based research funding systems will continue to accumulate in the coming years, the debate on the proper use of research metrics will also continue, both within academia and in society.

We offer this Flemish perspective on the Leiden Manifesto as a suggestion to colleagues worldwide to compare their local bibliographic information systems with the principles set forth in the Leiden Manifesto.

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# JoEMLS English Summary



# What We Have Learned from San Francisco Declaration on Research Assessment and Leiden Manifesto?

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## Abstract

*In recent years, the research performance evaluation of members of the academic community conducted by government or institutions has been applied with multiple indicators and peer review, however, there are many controversies about the design and application of research evaluation indicators. This article aims to introduce the development process of San Francisco Declaration on Research Assessment (DORA) and Leiden Manifesto and summarize their contents of guidelines and attempts to compare the differences between these two documents. It hopes that this article can arise the attention and reflection of research evaluation indicators and relevant issues from Taiwan academic community to reach consensus of utilization of research evaluation indicators. It will be beneficial to develop the version of declaration with local characteristics in the future.*

**Keywords:** San Francisco Declaration on Research Assessment (DORA), Leiden Manifesto, Informetrics, Research evaluation indicator

## SUMMARY

### Introduction

In April of 2015, an article titled as *Bibliometrics: The Leiden Manifesto for research metrics* (Leiden Manifesto as the short form) was published on the journal *Nature*, in which several scholars from informetrics field discussed about some worrying phenomenon, such as abuse of indicators of research evaluation, conflicts between metrics analysis and results of research assessment, and over-emphasis on citation-based indicators; they also proposed ten principles for academic research assessment (Hicks, Wouters, Waltman, de Rijcke, & Rafols, 2015). In fact, this is not the first declaration about research evaluation indicators

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proposed by academic communities. In December of 2012, in the annual meeting of The American Society for Cell Biology (ASCB), a group of academic journal editors and publisher representatives issued together a suggestion about research assessment, titled as *San Francisco Declaration on Research Assessment (DORA)*. In this declaration, 18 principles about research assessment were proposed, including overall principles and specific principles for groups of different stakeholders. In this article, the authors focus on introduction and analysis of these two declarations, with an intention to increase awareness and reflections of Taiwan academic communities, for reaching a consensus and even developing a local version of Leiden Manifesto.

### **Reactions and Discussions after DORA was published**

After San Francisco Declaration on Research Assessment was published, many well-known academic journals discussed cases of over-relying on journal impact factor and their expectations about DORA in their editorials. Through an integrated search of articles ever citing or mentioning DORA, we can see 24% (45/191) are editorials in Scopus and 41% (13/32) in Web of Science, indicating that editors-in-chief had a higher awareness of this issue than other academic community members and declared the positions of the represented journals. With the increasing number of supporting institutes, some universities and research institutes changed their process of research assessment. However, some scholars stated that, even though the major appeal of DORA is calling for stopping using the journal impact factor as the evaluation indicator in any level, or scrutinizing content and quality of articles instead of using quantitative metrics as the major assessment approach, the problem of misconceptions and abuses of metrics would still exist. Instead of proposing which metrics should or should not be used, maybe it is more important to make a set of overall and comprehensive guidelines. In other words, we need a second version of DORA- a set of guidelines with people's consensus and for flexible applications (Jacobs, 2013).

### **Reactions and Discussions after Leiden Manifesto was published**

Different from DORA, Leiden Manifesto was a self-reflection of infometrics scholars, and an outcome of their brainstorming and debating. The proposed principles include stating concepts of informetrics and reminders about collecting data and computing metrics, as well as suggestions for general science assessment, indicating that their target groups include both the assessors and the assessed in the whole academic communities. From the search results in citation databases, we can see that the most citing journals include major journals in informetrics field, such as *Journal of Informetrics* and *Scientometrics*, as well as

the interdisciplinary mega journal *PLoSOne*. The Leiden Manifesto also raised the awareness of international institutes. For example, Higher Education Funding for England (HEFCE) published a report titled as *The metric tide: Report of the independent review of the role of metrics in research assessment and management*, stating the five features of responsible metrics, including robustness, humility, transparency, diversity and reflexivity (Wilsdon et al., 2015). This report, together with DORA and Leiden Manifesto, are considered the three important documents of research assessment. Although it is impossible that the research communities would stop using traditional bibliometric indicators at this point, it might be a turning point for the community to re-examine the reasonableness of using metrics. It would have a great impact on the research assessment model of the next decade (OECD, 2016).

### **Differences between Leiden Manifesto and DORA**

In terms of propaganda strategies, DORA is included in ASCB, while the Leiden Manifesto is not belonged to any societies of informetrics, such as ISSI Society. The Leiden Manifesto was co-authored by a group of informetrics scholars and submitted to the journal *Nature*. With a form of journal article, it could be cited and thus more well-known. The two documents are both posed on web pages, but the layout arrangements are somehow different. The web page of DORA has a signature page, while the Leiden Manifesto web page provides a more diverse set of propaganda channels, such as offering full-text translations of 16 languages at this point, including Traditional Chinese version. The spontaneous action of these international scholars indicates they not only agree on the content of Leiden Manifesto, but also would like to raise the awareness of academic community members in their countries and propose a correct attitude of using metrics.

### **Conclusions**

A highly debated issue in the Taiwan academic community is whether the relationship between academic competitiveness and utilization of research assessment metrics is “carrot and stick”; and thus it needs to re-examine the whole research evaluation system. The most criticized phenomenon is that the whole academic community over-emphasizes journal articles of SCI and SSCI, so scholars care only about accumulated points of journal impact factor and thus neglect the essence of research; while scholars are over-pursuing the number of citations, they forget that their researches should be with more societal impact. However, are these informetric indicators so unpardonably vicious? After re-examining the contents of DORA and Leiden Manifesto, as well as international

academic communities' reactions toward these proposed documents, we can see that the real problem is not in research assessment indicators themselves, but in the timing and approaches of using these indicators. When correcting the deformed phenomenon, maybe we can gain some insights from the declarations. Therefore in this article, we suggest that in the future the informetrics field and research policy field should cooperate to promote the declaration contents, for academic community members to have a correct view toward informetrics and understand the contexts of development, as well as raise their awareness of informetrics, including consistent terminology and definitions. Only when scholars have a correct knowledge about informetrics, they can use correctly, and thus even develop a declaration suitable for the local academic community in Taiwan.

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# JoEMLS English Summary

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2015年1月31日修訂

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林雯瑤、邱炯友(2012)。教育資料與圖書館學四十年之書目計量分析。教育資料與圖書館學，49(3)，297-314。【Lin, Wen-Yau Cathy, & Chiu, Jeong-Yeou (2012) A bibliometric study of the *Journal of Educational Media & Library Sciences*, 1970-2010. *Journal of Educational Media & Library Sciences*, 49(3), 297-314. (in Chinese)】

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