

# 圖書館因應研究與教學 趨勢的新服務

黃明居 | 國立陽明交通大學圖書館館長



# 目錄

1.

教學研究之趨勢與AI工具崛起

2.

圖書館資源 ( LSPs ) 與教學平台無縫串接

3.

研究資料管理(RDM)推廣與實踐

4.

AI工具應用與推廣

5.

結論與展望



近年來影響最大的因素  
-COVID  
-AI (ChatGPT)

# 01

## 創意的發想與實踐

- ✓ 教學- LIS與教學平台串接
- ✓ 研究- RDM的實踐
- ✓ 科技- AI工具的應用



# Trendspotting-Looking to the Future in a Post-Pandemic Academic Library Environment



Digital transformation and digital shift

加速數位治理  
與數位轉型

數位轉型



Open Higher Education

遠距教與學與  
在家工作需求

讀者需求



Data management and curation

開放研究文獻  
與研究資料

資料開放

....



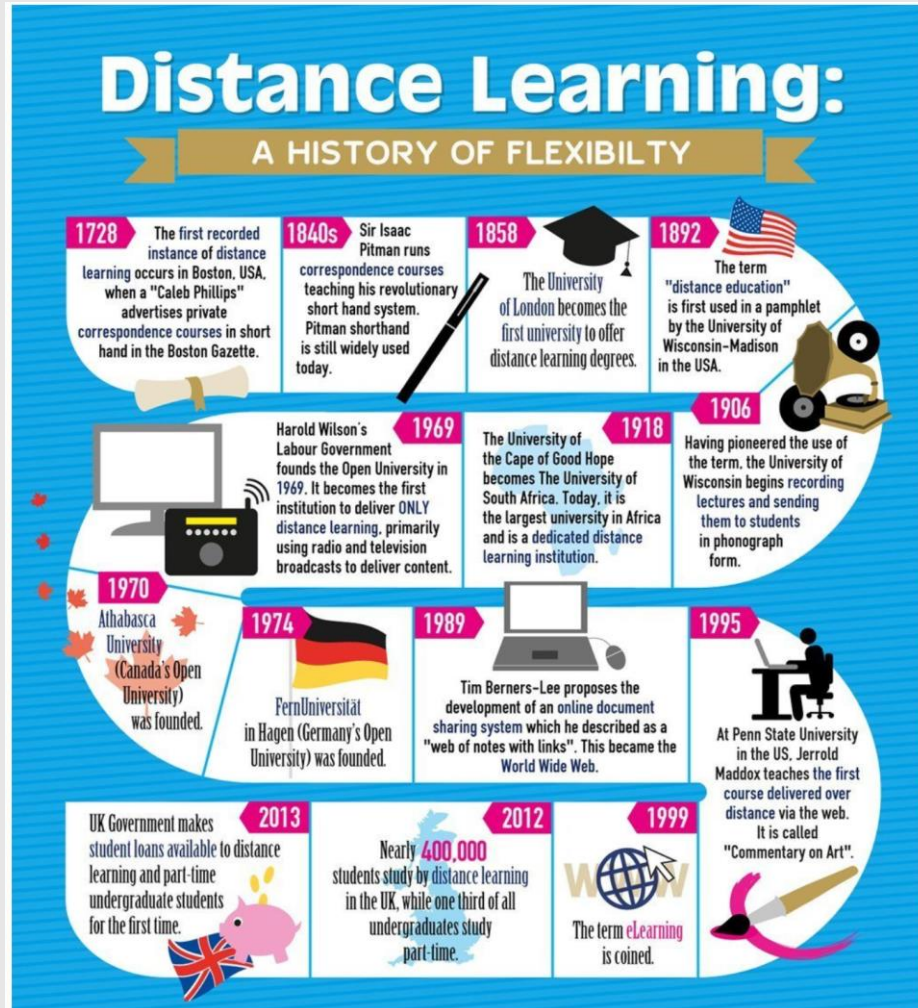
# 02

## 遠距教與學趨勢

圖書館資源 ( LSPs ) 與教學平台無縫串接



# 遠距教學歷史 ( The History Of Distance Learning )



- 隨著科技的發展與演進，教學方式與輔具一直在進步
- 1970 “Open University”
- 1989 “Web of notes with links”
- 1995 Jerrold Maddox first course delivered over distance via the web
- 1999 eLearning is coined
- 2012 DL students
- 2019 COVID-19...

# 學習管理系統



資料來源：<https://www.thesearchengineshop.com/learning-management-system-lms-software/>

2024/05/09

- What to Look For in the Best Learning Management Systems (LMS) & Software?
  - ✓ Intuitive Page Builder
  - ✓ Learner Progress Tracking
  - ✓ Content Drip
  - ✓ Tests and Quizzes
  - ✓ Certificates and Badges
  - ✓ Automated Emails
- The Best Learning Management Systems and Software
  - ✓ Kajabi
  - ✓ Teachable
  - ✓ Adobe Captivate Prime
  - ✓ Moodle
  - ✓ Blackboard Learn
  - ✓ Thinkific
  - ✓ Docebo

# 教學場域(教學平台)



教師

- 備課彙整資料過程繁瑣
- 靜態文字呈現
- 多樣資源/來源 不易管理
- 資源可得/可用性 檢視困難
- 無法評估教材對學生學習成效



學生

- 指定教科書
- 反覆複製/貼上查詢
- 資料分散各處
- 查找不易、浪費時間
- 線上資源連結無效、斷點問題
- 只是靜態文字，缺乏吸引力
- ...



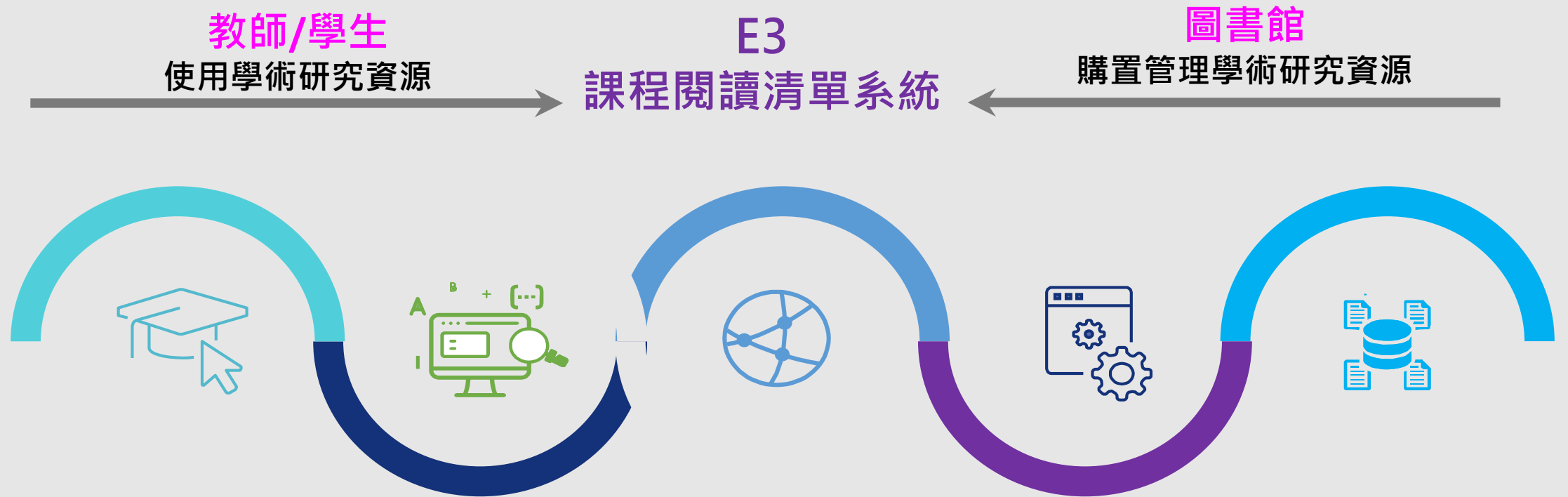
圖書館員

- 只作課程教科書，未有效利用館內各類資源
- 全人工處理
- 個別徵詢，過程耗時
- 教學支援任務角色薄弱
- ...

圖書館如何提供教學場域更好的資訊服務？



# 教學平台（E3）與圖書館資源LSPs串接



所需教學參考資料  
搜尋、管理、使用

各類型教學資源  
採購、管理、提供

2024/05/09 NYCU New\_e3

LSPs+串接軟體

# 串接教學平台

- 過去教學平台均未考慮圖書館資源
  - ▣ 透過LSP與教學平台緊密串接
  - ▣ 串接MOOC教學平台
- 教師課程綱要與指定參考書
  - ▣ LSP系統可標記為指定參考書，列出每位老師過去課程的指定參考書群
  - ▣ 教師撰寫課綱時，直接串接到LSP查詢，與教學平台串接整合
- 指定閱讀文章與書籍
- 透過LSPs再將教學使用資源與圖書館資源緊密結合
  - ▣ 挽回讀者的黏稠度

# 學習平台與LSPs串接過程

The screenshot displays a learning management system (LMS) interface. At the top, a blue header bar contains the course title "【111上】534001 教育研究法 Educational Research Methods" and a "當期課程" (Current Course) label. Below the header, the course details are shown, including the course code "1111.534001" and the semester "2022/23, 學期 1". A sidebar on the left lists various course management options such as "課程資訊", "課程綱要", "成員", "公告列表", "我的郵件", "內容管理", "大綱管理", "同步教室 (QC3)", "教材管理", "作業管理", "自動提醒", "討論區管理", "試卷管理", "題庫維護", "分組管理", "評量管理", and "成績管理". The main content area is divided into sections for "課程閱讀清單連結" (Course Reading List Links), "課堂選讀或延伸閱讀" (Classroom Reading or Extension Reading), and "Documents". The "Documents" section shows a list of documents, including "Rethinking maritime businesses for the digital age: the evolving role of ship agents". A table below the documents displays student usage statistics.

學生使用量	有學生互動	活動總數	學生使用量	學生全文檢視次數	學生檔案下載次數	已留言的學生	學生讀數	註記已完成的學生
每週有互動的學生	4	7	中等的	2	0	N/A	0	0

# 教師面向

## ■ 與圖書館協同創建 Reading List

✓ 如：館藏紙本書、電子書、期刊文章、資料庫、影音、網路資源...

## ■ 串接網路學習資源(非館藏)

## ■ 創建、分享、設定使用期間與重覆使用內容項目

## ■ 統計數據及使用情形優化清單

# 學生面向

## ■ 從教學平台即時取得圖書館資源與課程內容。

## ■ 自行建立 My Collection

## ■ 教材使用數據指標，使參與度可以被觀察到。

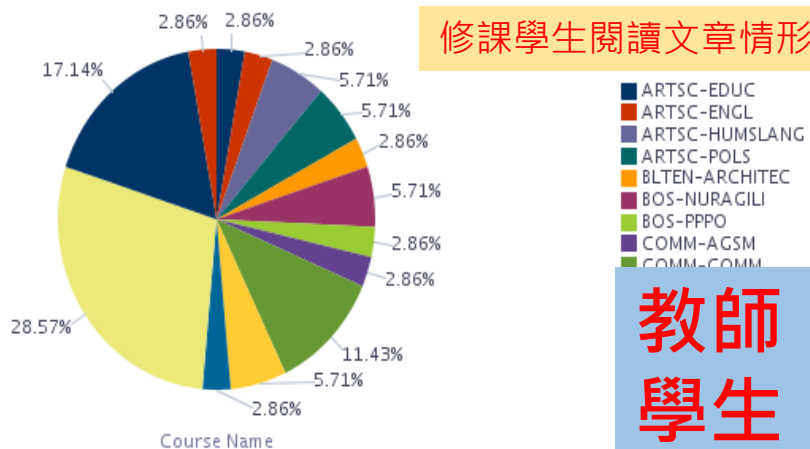
## ■ 透過課程教材互動的數據，可了解學習的過程。

# 圖書館（機構）面向

- 緊密串接教學平台與資源平台間的**資料交流**
- 滿足**教，學**所需的**資訊**，並確保資源取得的**便利性**
- 提供新的界面，讓**教，學者**就教材內容**互動與交換意見**
- **統計分析**學生使用教材的情形
- 透過課程教材互動的數據，更了解師生對學習資料需求與**學習過程的效果**

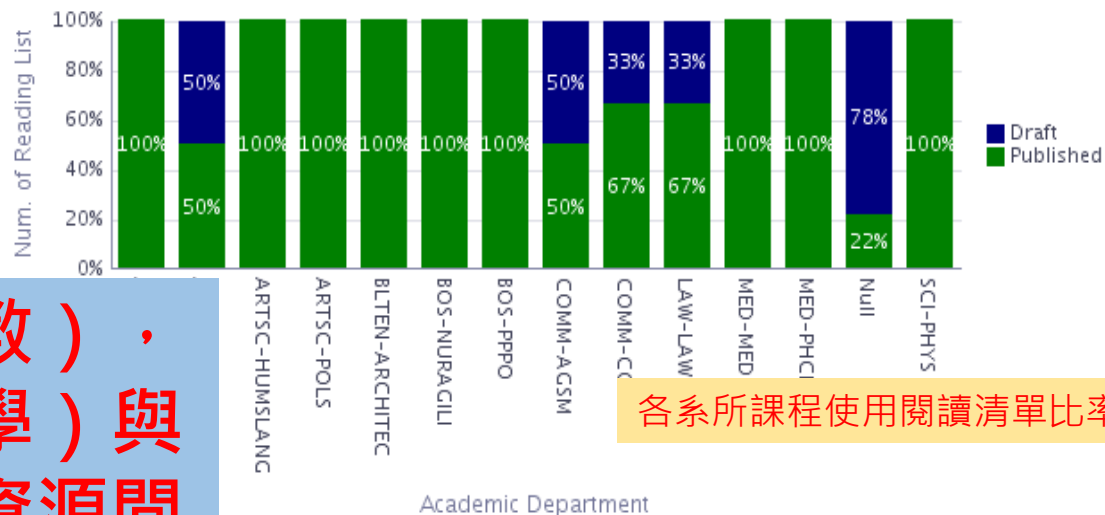
# 系統提供整體的分析統計報表

Distribution of RL in Academic departments – per publication status



修課學生閱讀文章情形

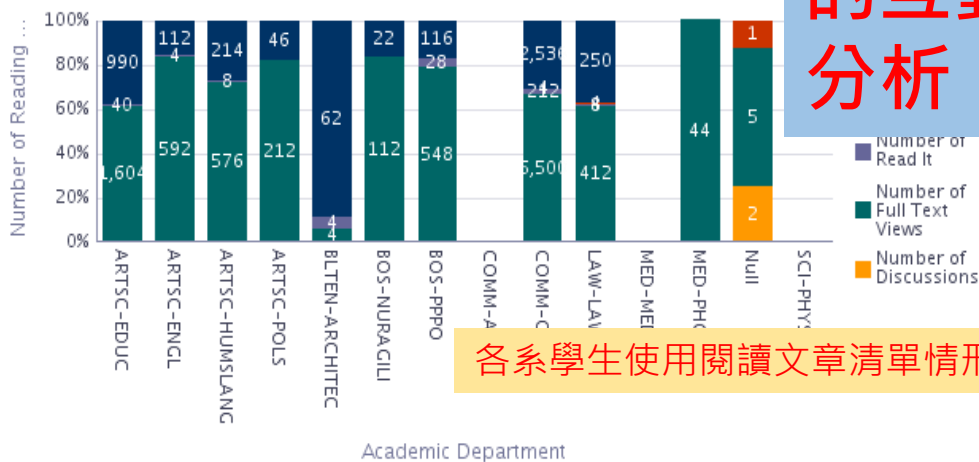
Publication status in Academic departments



各系所課程使用閱讀清單比率

教師 (教) , 學生 (學) 與圖書館資源間的互動與回饋分析

Segmentation per Academic department



各系學生使用閱讀文章清單情形


Overall view Over time




閱讀文章時間的整體統計

# 整體效益

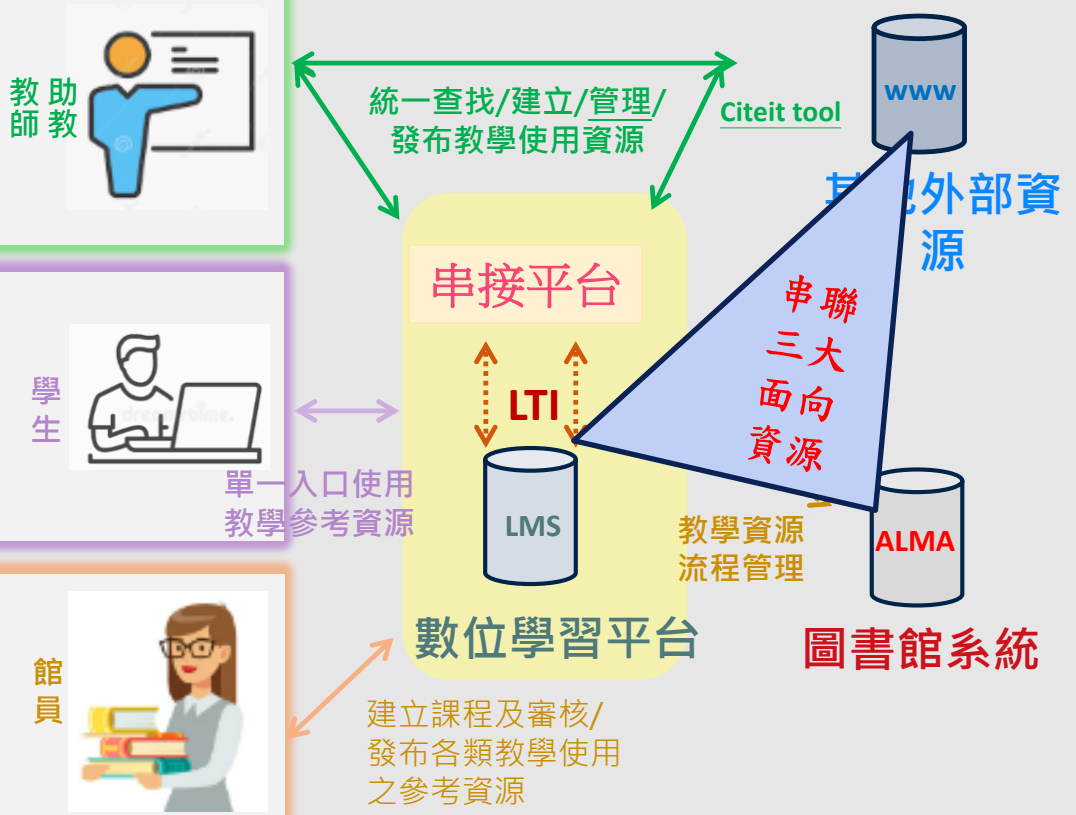

- 易於管理教學資源
- 資源對學生即時公布/更新/互動
- 有效評估學生使用參考資源情形
- 透過平台直接與館員對接



- 即時取用教師指定教學資源
- 可在利用平台老師互動/討論
- 節省找尋與彙整資訊時間
- 提昇學習研究效率



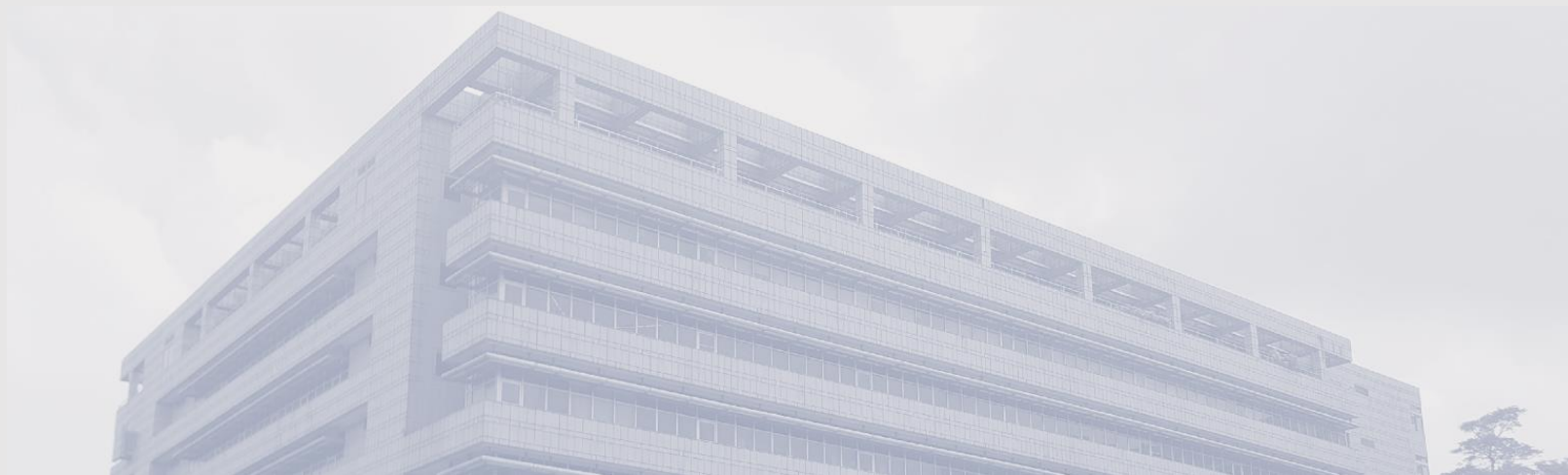
- 與教師直接利用平台互動支援
- 有效滿足學用雙方之供需
- 無縫結合館藏與教師多元化資源
- 可評估館藏整體運用



執行面的挑戰：館員需要深入了解課堂的資訊需求

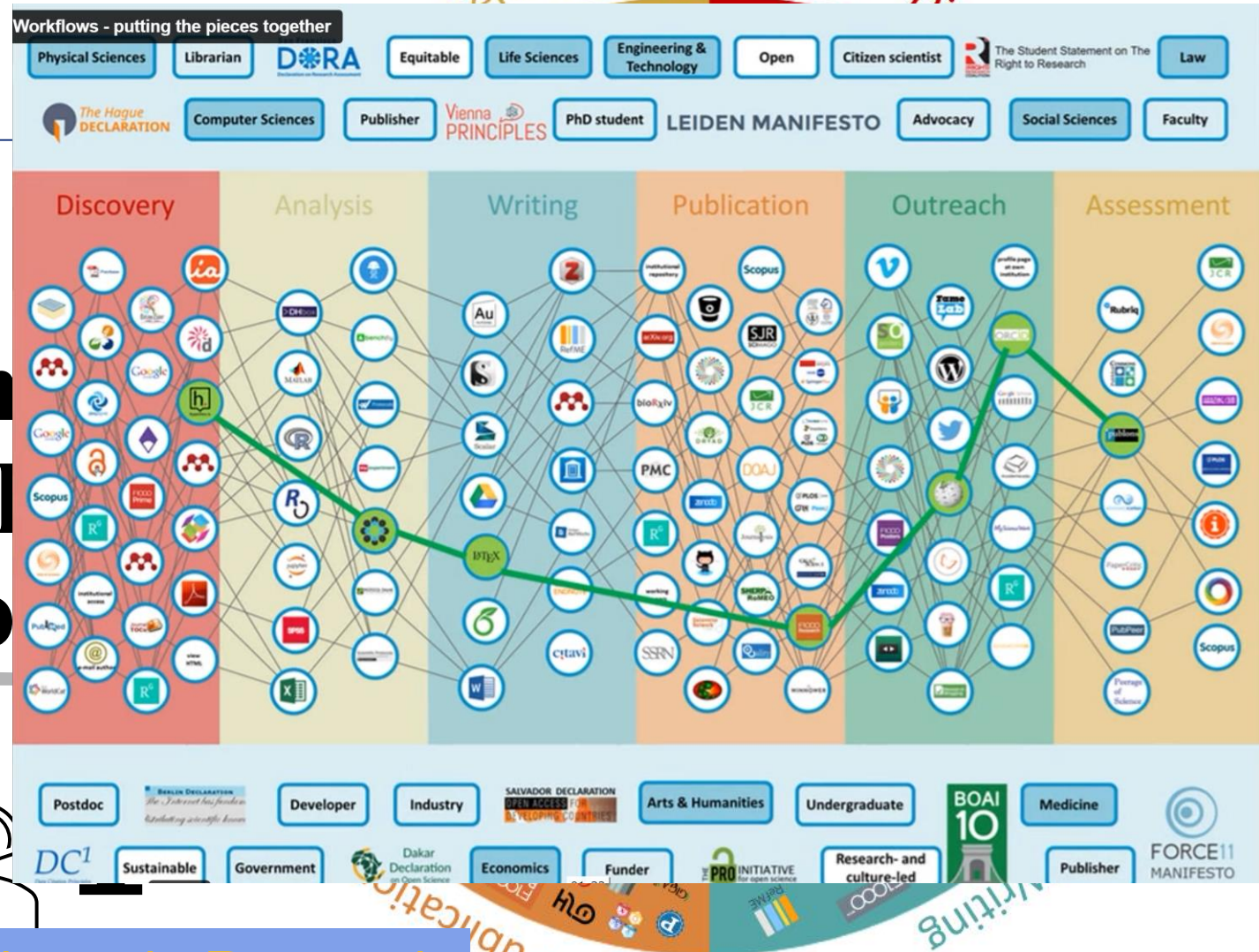
# 03

## 研究資料管理(RDM)推廣與實踐





# The Changing Research Workflow

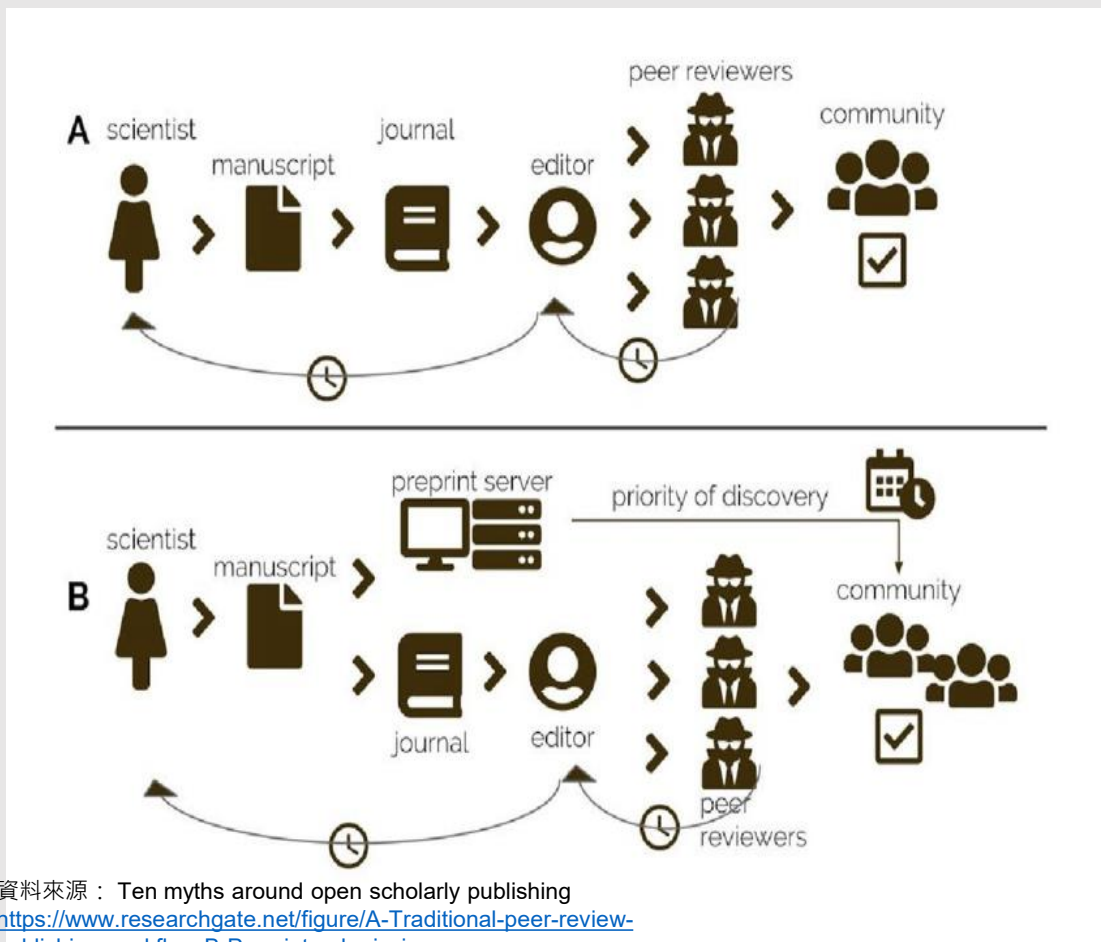


## Role of Library in Research

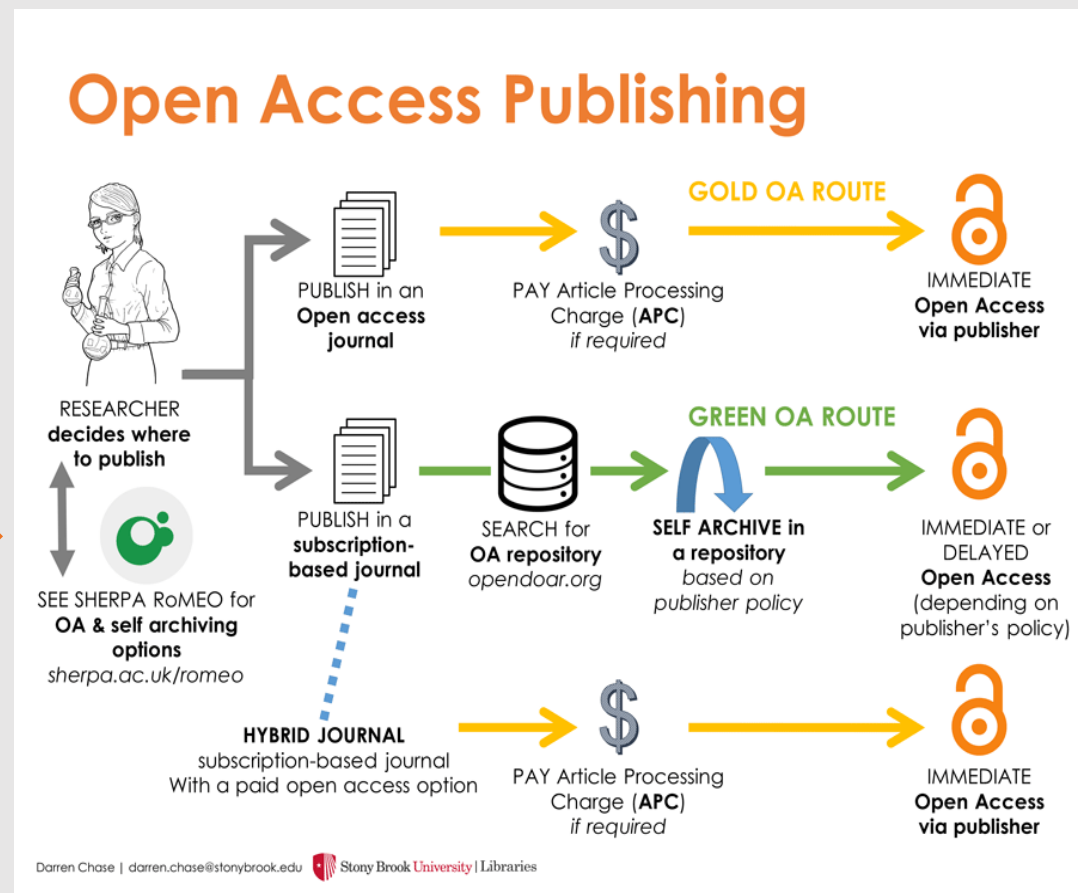
資料來源：101 Innovations in Scholarly Communication - the Changing Research Workflow

[https://figshare.com/articles/poster/101\\_Innovations\\_in\\_Scholarly\\_Communication\\_the\\_Changing\\_Research\\_Workflow/1286826](https://figshare.com/articles/poster/101_Innovations_in_Scholarly_Communication_the_Changing_Research_Workflow/1286826)

# 更多型態的學術投稿與出版



資料來源：Ten myths around open scholarly publishing  
[https://www.researchgate.net/figure/A-Traditional-peer-review-publishing-workflow-B-Preprint-submission-establishing\\_fig2\\_331701285](https://www.researchgate.net/figure/A-Traditional-peer-review-publishing-workflow-B-Preprint-submission-establishing_fig2_331701285)



資料來源：Open access: Latest news and trends: Publishing your research in Open Access  
<https://canterbury.libguides.com/c.php?g=894027&p=6640992>

# Open Access | Data Sharing



**GRANTS & FUNDING**

NIH Central Resource for Grants and Funding Information

Search this Site



[eRA](#) | [NIH Staff](#) | [Glossary](#) | [FAQs](#) | [Help](#)

[HOME](#)

[ABOUT GRANTS](#)

[FUNDING](#)

[POLICY & COMPLIANCE](#)

[NEWS & EVENTS](#)

[ABOUT OER](#)

Even if NIH support is sought to transform or link datasets (as opposed to producing a new set of data), the investigator should still include a data-sharing plan in the application. If there are limitations associated with a data-sharing agreement for the original data that preclude subsequent sharing, then the applicant should explain this in the application.

## IMPLEMENTATION

The NIH data-sharing policy applies to applicants seeking \$500,000 or more in direct costs in any year of the proposed research. The \$500,000 threshold corresponds to the threshold set in the October 16, 2001 NIH Guide, where applicants requesting \$500,000 or more in direct costs for any year must seek agreement by NIH Institute or Center (IC) staff to accept assignment of their application at least 6 weeks prior to the anticipated submission date. (See <http://grants2.nih.gov/grants/guide/notice-files/NOT-OD-02-004.html>). That policy directs applicants to contact in writing or by telephone IC program staff during the development process of the application but no later than 6 weeks before the anticipated submission date. Applicants are encouraged to discuss their proposed data-sharing plan with IC program staff at that time.

**NEWS: New NIH Policy on Data Management and Sharing** (effective January 25, 2023)

NIH has issued a new [Final NIH Policy for Data Management and Sharing](#), which will require NIH funded researchers to prospectively submit a plan outlining how scientific data from their research will be managed and shared. On January 25, 2023, the new policy will come into effect and replace the 2003 NIH Data Sharing Policy currently in effect.

資料來源 : NIH GRANTS & FUNDING  
<https://grants.nih.gov/grants/oer.htm>

# 期刊中的研究資料 Supplementary Information



nature.com

Taylor & Francis Online



nature communications

View all journals Search Q Login @

Explore content v About the journal v Publish with us v Sign up for alerts 🔔 RSS feed

nature > nature communications > articles > article

Article | Open Access | Published: 19 July 2022

## Stomatin modulates adipogenesis through the ERK pathway and regulates fatty acid uptake and lipid droplet growth

Shao-Chin Wu, Yuan-Ming Lo, Jui-Hao Lee, Chin-Yau Chen, Tung-Wei Chen, Hong-Wen Liu, Wei-Nan Lian, Kate Hua, Chen-Chung Liao, Wei-Ju Lin, Chih-Yung Yang, Chien-Yi Tung & Chi-Hung Lin

Nature Communications 13, Article number: 4174 (2022) | Cite this article

2892 Accesses | 9 Altmetric | Metrics

### Abstract

Regulation of fatty acid uptake, lipid production and storage, and metabolism of lipid droplets (LDs), is closely related to lipid homeostasis, adipocyte hypertrophy and obesity. We report here that stomatin, a major constituent of lipid raft, participates in adipogenesis and adipocyte maturation by modulating related signaling pathways. In adipocyte-like cells, increased stomatin promotes LD growth or enlargements by facilitating LD-LD fusion. It also promotes fatty acid uptake from extracellular environment by recruiting effector molecules, such as FAT/CD36 translocase, to lipid rafts to promote internalization of fatty acids. Stomatin transgenic mice fed with high-fat diet exhibit obesity, insulin resistance and hepatic impairments; however, such phenotypes are not seen in transgenic animals fed with regular diet. Inhibitions of stomatin by gene knockdown or OB-1 inhibit adipogenic differentiation and LD growth through downregulation of PPAR $\gamma$  pathway. Effects of stomatin on PPAR $\gamma$  involves ERK signaling; however, an alternate pathway may also exist.

Download PDF

Sections Figures References

Abstract

Introduction

Results

Discussion

Methods

Data availability

References

Acknowledgements

Author information

Ethics declarations

Peer review

Additional information

Supplementary information

Source data

Rights and permissions

About this article

Comments

### Supplementary information

- Supplementary Information
- Peer Review File
- Description of Additional Supplementary Files
- Supplementary Data 1
- Supplementary Movie 1
- Reporting Summary

# Make Data **FAIR**



## **F**indable

- F1 (後設)資料被附予一個全球唯一且永久不變的識別碼。
- F2 資料被豐富的后設資料所描述。
- F3 後設資料指定資料識別碼。
- F4 (後設)資料在可搜索的資源中註冊或索引。



## **A**ccessible

- A1 (後設)資料使用標準化的通信協議，以通過其識別碼檢索。
  - A1.1通信協議是開放，免費且可通用實施的。
  - A1.2通信協議允許在必要時進行驗證與授權程續。
- A2 即使資料本身不再可取得，後設資料也仍可取用



## **I**nteroperable

- I1 (後設)資料使用正規化、可取用、可共享和廣泛適用的語言進行知識再現。
- I2 (後設)資料使用符合FAIR原則的語彙。
- I3 (後設)資料包括對其他(後設)資料的合適參照。



## **R**eusable

- R1(後設)資料具有多重準確且相關的屬性。
  - R1.1(後設)資料借由清晰易讀的資料使用授權進行發佈。
  - R1.2(後設)資料具備資料溯源。
  - R1.3(後設)資料符合領域相關的社群標準。

# Research Data Management (RDM)

- 透過**研究資料公開共享**，促使研究過程透明化，達成研究資料**再利用**的效益
- 歐美研究資助單位將資料管理計畫（**Data Management Plan, DMP**）視為必備要素
- 國際出版社要求公開
- 哈佛大學圖書館與**IQSS**合作開發非商業的研究資料管理系統 – **Dataverse**
  - ▣ 已有78個單位加入社群
  - ▣ 至今文件下載量已經超過三千萬

# NYCU Dataverse 研究資料管理平台

The image displays a composite view of the NYCU Dataverse website. On the left is the homepage, which includes the site logo, navigation links, a search bar, and introductory text about the platform's mission and how to use it. On the right is a search results page showing a list of datasets with details such as replication date, author names, and metadata sources. A large red URL is overlaid on the center of the image.

<https://dataverse.lib.nycu.edu.tw>

# NYCU Dataverse

陽明交大 **NYCU Dataverse** Add Data ▾ Search ▾ User Guide Support English ▾ Log In

**Metrics** 98 Downloads Contact Share

Search this dataverse...   [Advanced Search](#)

**Dataverses (0)**  
 **Datasets (69)**  
 **Files (4,166)**

**Publication Year**  
2022 (69)

**Author Name**  
Wei-Chen Chiu (29)  
Yi-Hsuan Tsai (13)  
Min Sun (7)  
Shyan-Ming Yuan (6)  
Fu-En Wang (4) [More...](#)


**Subject**  
Computer and Information Science (42)  
Medicine, Health and Life Sciences (27)  
Engineering (5)  
Business and Management (3)  
Social Sciences (2) [More...](#)

**Keyword Term**  
machine learning (2)

**1 to 10 of 69 Results**

**Escaping from Zero Gradient: Revisiting Action-Constrained Reinforcement Learning via Frank-Wolfe Optimization**


Jul 29, 2022

 Ping-Chun Hsieh; Jyun-Li Lin, 2022, "Escaping from Zero Gradient: Revisiting Action-Constrained Reinforcement Learning via Frank-Wolfe Optimization", <https://doi.org/10.57770/QHNWZ7>, NYCU Dataverse, V2

This repo contains code accompanying the paper, Escaping from Zero Gradient: Revisiting Action-Constrained Reinforcement Learning via Frank-Wolfe Optimization (JAI 2021). It includes code for running the NFWPO algorithm presented in the paper, and other baseline methods such as DD...

**NeuralScale: Efficient Scaling of Neurons for Resource-Constrained Deep Neural Networks**


Jul 19, 2022

 Eugene Lee; Chen-Yi Lee, 2022, "NeuralScale: Efficient Scaling of Neurons for Resource-Constrained Deep Neural Networks", <https://doi.org/10.57770/UJTOCI>, NYCU Dataverse, V1, UNF:6:v40UHwkcUd6p8L770pE8zg== [fileUNF]

Deciding the amount of neurons during the design of a deep neural network to maximize performance is not intuitive. In this work, we attempt to search for the neuron (filter) configuration of a fixed network architecture that maximizes accuracy. Using iterative pruning methods as...

**Meta-rPPG Remote Heart Rate Estimation Using a Transductive Meta-Learner**

Jul 19, 2022

 Eugene Lee; Evan Chen; Chen-Yi Lee, 2022, "Meta-rPPG Remote Heart Rate Estimation Using a Transductive Meta-Learner", <https://doi.org/10.57770/HDLEQ0>, NYCU Dataverse, V1

Remote heart rate estimation is the measurement of heart rate without any physical contact with the subject and is accomplished using remote photoplethysmography (rPPG) in this work. rPPG signals are usually collected using a video camera with a limitation of being sensitive to m...



# 支援研究的新服務- RDM



研究資料佐証投稿文獻

**學術倫理**



掌握研究資料

**學術資產**



增加學術單位

**國際曝光**



增加學術單位

**引用計數**



促進研究及教學

**再運用**

# 研究資料再運用成功案例-臨床應用



黃柏勳

醫學院重症內科  
教授

- 進行關於高血壓患者腎功能相關的研究，招募100名高血壓患者收集研究資料並以此為主題發表了文獻。
- 奠基這篇高血壓腎功能文獻的研究資料並沒有從此束之高閣。
- 來自尼德蘭馬斯垂克大學的學者連絡上黃柏勳教授，希望可以了解更多關於研究資料的內容，最終黃柏勳教授作為協同作者發表文獻，達成台灣與尼德蘭的跨國合作。
- 透過NYCU Dataverse上傳研究資料，增加引用計數、達成國際合作！

# 研究資料再運用成功案例-教學應用



楊智傑

腦科，所長

- 研究資料除了學術研究，還有其他運用方式
- 融合已有的研究資料資源，培養學生研究資料再運用。  
在楊教授的課程中，
  - 學生運用研究資料平台取得研究資料，
  - 擬定主題進行研究資料再運用
  - 並做為教學之使用。
- 學習研究資料使用是研究歷程中不可或缺的一環，運用NYCU Dataverse，實踐更多再運用教學。

# 04

## AI工具應用與推廣



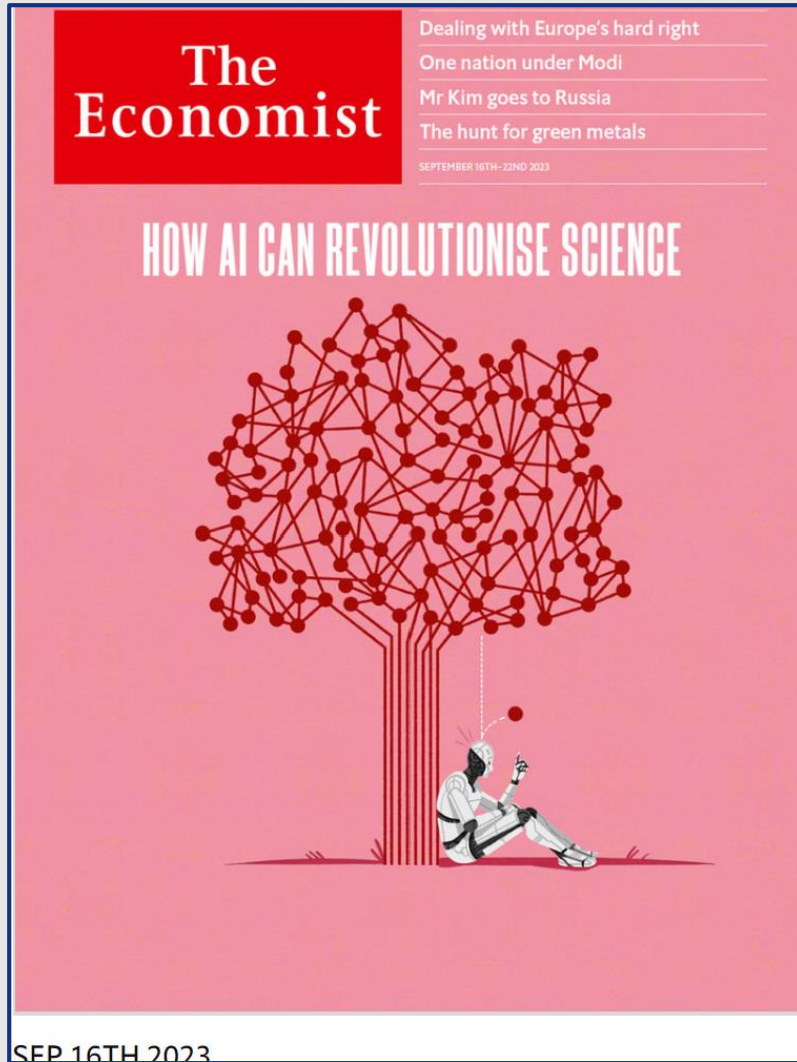


# AI時代的大問題

- 當機器能讀取~~(讀懂?)~~圖書館所有資料時，圖書館和館員會發生什麼事（影響）？

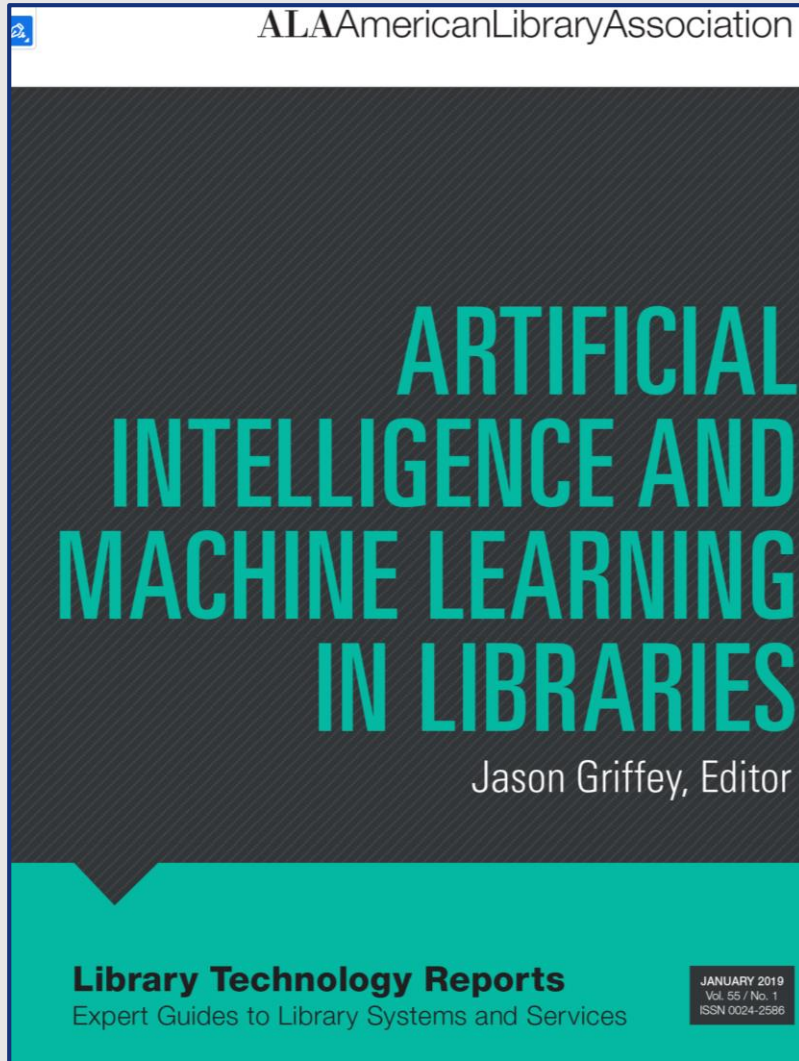
“What Happens to Libraries and Librarians When Machines Can Read All the Books?” (Chris Bourg, 2017 )

- 圖書館可以提供怎樣的資訊服務？  
( Smart Library Services? )
- 圖書館與圖書館館員應如何因應？



# How AI can Revolutionise Science (2023.09)

- ✓ 封面那棵樹的意涵？
- ✓ AI 加速科學的發展，徹底改變？  
推動科學進步並引領發現的黃金時代  
(AI can turbocharge scientific progress and lead to a golden age of discovery)
- ✓ **Literature-based Discovery (LBD)**  
identifying new experiments to try and even suggesting potential research collaborators
- ✓ **“Robot Scientists”, “Self-driving Labs”**



## AI and ML in Libraries (2019)

- ✓ Introduction
- ✓ HAMLET
- ✓ AI and Creating the First Multidisciplinary AI Lab
- ✓ An Exploration of Machine Learning

# AI and ML in Libraries

- 電子書籍或期刊的**提供商**(擁有大量數字化文本語料庫)
  - ✓ 嘗試以AI和ML為基礎的**新索引與搜尋服務**
- 機器學習系統經過訓練，創建Metadata的潛力非常高 ( **人工智慧的編目系統** )
  - ✓ 更加注重**培訓數據的準備和產出的評估**，而不是直接創建描述 ( **館員的重要角色** )
- **個人化服務**：隨著系統根據讀者的行為進行自我訓練，隨時間的推移，系統會繼續學習
- **研究人員和學生將擁有AI系統**，協助他們尋找資訊、總結資訊並建立個人參考書目等
- 如何對待這些系統的**知識產權**將對圖書館未來如何使用、蒐集、共享和保存等將會有長期影響
- **AI & ML系統值得圖書館和圖書館員密切關注!**
- 當機器人能夠寫出與人類所寫的論文毫無區別時，**教育將如何改變？**





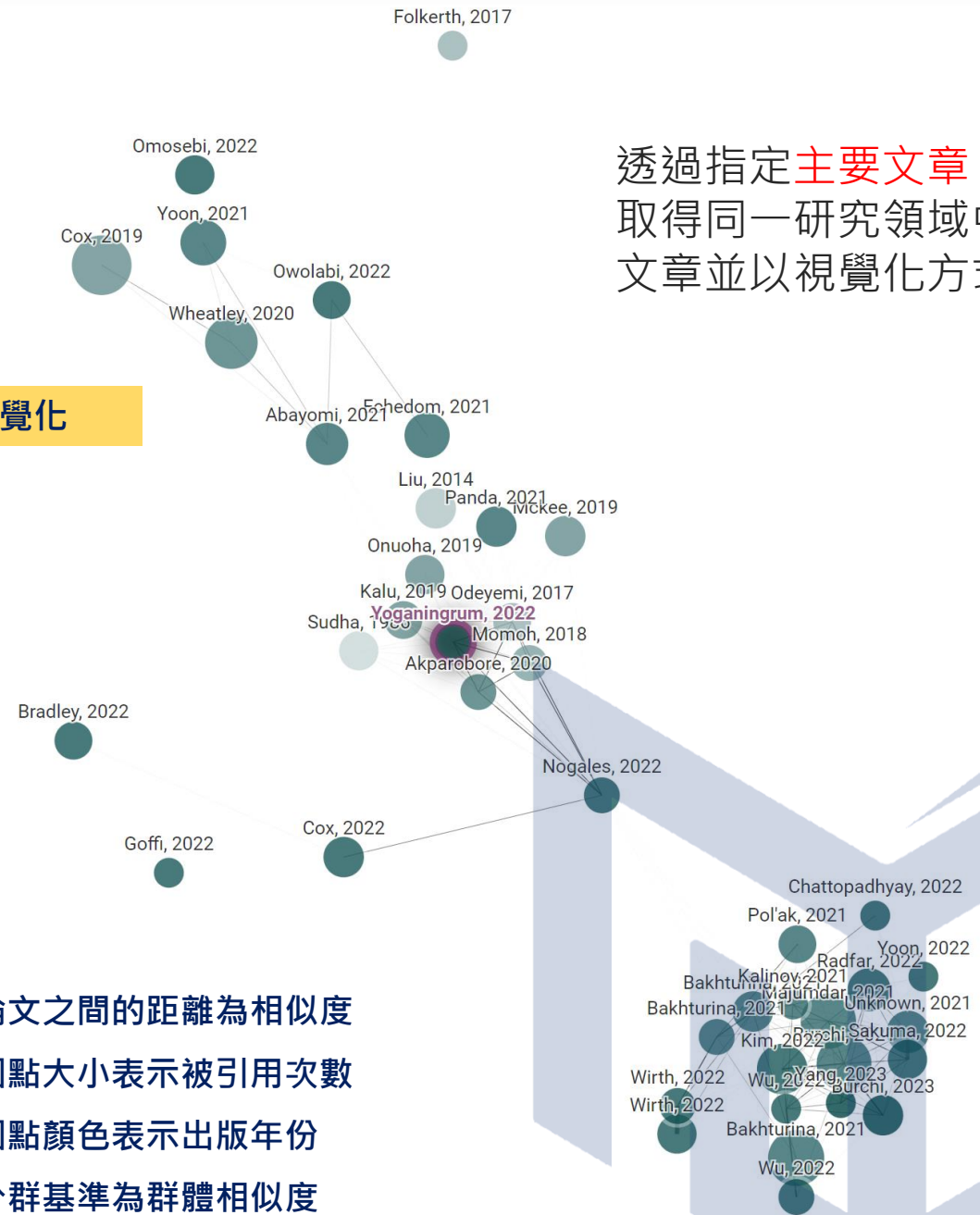
# Connected Papers

<https://www.connectedpapers.com/>

## 學術領域視覺化

1. 論文之間的距離為相似度
2. 圓點大小表示被引用次數
3. 圓點顏色表示出版年份
4. 分群基準為群體相似度

透過指定**主要文章**，  
取得同一研究領域中相似  
文章並以視覺化方式呈現





# Semantic Scholar



## 自動產生文章摘要

- ✓ 透過專業背景知識與自然語言技術針對 6000 萬篇文章摘要，以利快速理解內容

## AI 驅動的個人化文章推薦

- ✓ 透過 AI 學習個人感興趣文章及新進著作間關係，自動推薦最新內容，維持知識更新

## 整合式文章閱讀器

- ✓ 透過分析文章與關聯引用文獻，可直接閱讀引用文獻摘要、查閱文章目錄、放入個人收藏並檢視機器自動標記的重點



# Semantic Scholar Reader

The screenshot displays the Semantic Scholar Reader interface. On the left, a dark sidebar contains a 'Table Of Contents' with the following items:

- 1 Introduction
- 2 Background: Recurrent Networks
  - 4.1 Evaluation
- 3 Long-term Recurrent Convolutional Network (LRCN) model
- 4 Activity recognition
  - 4.1 Evaluation
- 5 Image captioning
  - 5.1 Evaluation
    - 5.1.1 Retrieval
    - 5.1.2 Generation
- 6 Video description
  - 6.1 Evaluation
- 7 Related Work
  - 7.1 Prior Work
  - 7.2 Contemporaneous and Subsequent Work
- 8 Conclusion
- References
- Biographies
  - Jeff Donahue
  - Lisa Anne Hendricks
  - Marcus Rohrbach's

The main content area shows a paper titled 'On the Properties of Neural Machine Translation: Encoder-Decoder Approaches' by Kyunghyun Cho, Bart van Merriënboer, Yoshua Bengio, and SSST@EMNLP, dated 3 September 2014. The paper has 4,069 citations and 736 likes. The current view is on 'Section 4: Unlike existing labeled video activity datasets may not have actions or activities with particularly complex temporal dynamics, we nonetheless observe significant improvements on conventional benchmarks.' The text continues: 'Second, we explore end-to-end trainable image to sentence mappings. Strong results for machine translation tasks have recently been reported [9], [10]; such models are encoder-decoder pairs based on LSTM networks. We propose a multimodal analog of this model, and describe an architecture which uses a visual convnet to encode a deep state vector, and an LSTM to decode the vector into a natural language string (Figure 3 middle; Section 5). The resulting model can be trained end-to-end on large-scale image and text datasets, and even with modest training provides competitive generation results compared to existing methods. Finally, we show that LSTM decoders can be driven directly from conventional computer vision methods which predict higher-level discriminative labels, such as the un-'. The text is partially obscured by a blue arrow graphic pointing from the left sidebar.

At the top right of the interface, there is a navigation bar with options: 'Save To Library', 'Create Alert', and 'Cite'. Below this, a diagram (Figure 2) illustrates a basic RNN cell (left) and an LSTM memory cell (right). The RNN cell diagram shows an input  $x_t$  and a hidden state  $h_{t-1}$  entering a cell with a bias  $b$  and a weight  $W$ , producing an output  $z_t$  and a hidden state  $h_t$ . The LSTM cell diagram shows an input  $x_t$  and a hidden state  $h_{t-1}$  entering a cell with a bias  $b$  and a weight  $W$ , producing an output  $z_t$  and a hidden state  $h_t$ . The LSTM cell also includes a 'Forget Gate' and a 'Memory Gate'.

Figure 2. A diagram of a basic RNN cell (left) and an LSTM memory cell (right) used in this paper (from [13], a slight simplification of the architecture described in [14], which was derived from the LSTM initially proposed in [7]).

2 BACKGROUND: RECURRENT NETWORKS

urrent neural networks (RNNs, Figure 2, left) eral dynamics by mapping input sequences to e and hidden states to outputs via the following equations (Figure 2, left):

$$h_t = g(W_{xh}x_t + W_{hh}h_{t-1} + b_h)$$

$$z_t = g(W_{hz}h_t + b_z)$$

element-wise non-linearity, such as a sigmoid tangent,  $x_t$  is the input,  $h_t \in \mathbb{R}^N$  is the hidden N hidden units, and  $z_t$  is the output at time  $t$ . h  $T$  input sequence  $(x_1, x_2, \dots, x_T)$ , the updates inputted sequentially as  $h_1$  (letting  $h_0 = 0$ ),  $z_1$ ,  $z_2$ .

RNNs have proven successful on tasks such ognition [15] and text generation [16]. It can o train them to learn long-term dynamics, r part to the vanishing and exploding gradients hat can result from propagating the gradients down through the many layers of the recurrent network, each corresponding to a particular time step. LSTMs provide a solution by incorporating memory units that explicitly allow the network to learn when to "forget" previous hidden states and when to update hidden states given new information. As research on LSTMs has progressed, hidden units with varying connections within the memory unit have been proposed. We use the LSTM unit as described in [11] (Figure 2, right), a slight simplification of the one described in [8], which was derived from the original LSTM unit proposed in [7]. Letting  $\sigma(x) = (1 + e^{-x})^{-1}$  be the sigmoid non-linearity which squashes real-valued inputs to a  $[0, 1]$  range, and letting  $\tanh(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}} = 2\sigma(2x) - 1$  be the hyperbolic tangent non-linearity, similarly squashing its inputs to a  $[-1, 1]$  range, the LSTM updates for time step  $t$  given inputs  $x_t, h_{t-1}$ , and  $c_{t-1}$  are:

# 05

## 結論與展望



# 結論與展望

- 資訊環境的快速轉變（如AI工具快速發展），提供**創新**的服務更顯重要
- 透過**串接教學平台**，將讀者再拉回圖書館服務的平台
- 研究資料的保存與再利用，扮演**機構智慧資產保存者**角色
- 結合**LSPs的優勢**，串接機構中的服務平台，將LSPs成為大學核心的資訊服務平台
- 積極利用LSPs優勢，**與時俱進**，以讀者為中心，滿足讀者的需求，**個人化服務**勢在必行!



國立陽明交通大學圖書館

National Yang Ming Chiao Tung University Library

謝謝聆聽

**Thank you for listening**