Practical Implementation of Open Education & Competency-Based Training in Research Data Services: Lessons Learned from RDMLA and DSCPE

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Open Science, Open Education & & Competency - Based Training



Open Science: Definitions



 "an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community" (p.7).

White House OSTP (2023)

 "The principle and practice of making research products and processes available to all, while respecting diverse cultures, maintaining security and privacy, and fostering collaborations, reproducibility, and equity"







The Right to Education



(Blessinger, P. & Bliss, T. J., (2016). Chapter
1. Introduction to Open Education: Towards a
Human Rights Theory. In TJ Bliss and Blessingger,
P. eds. Open education: International perspectives in higher education (p. 378)) Education is a fundamental human rights.

The right to education includes:

- the right of *access* to education
- the right to *quality* education
- the right to *respect* within the learning environment.

Open education is part of a wider effort to democratize education.

Open Education: Definitions

Open Education Global (OEGlobal). "Open education maximizes access and participation by ensuring education is inclusive, equitable, adaptable, and supportive of life-long learning for all people across the globe. Open education encourages collaboration and allows teachers and learners both inside and outside of the classroom to use, create, and modify resources that enable every learner to reach their full human potential." (p.3)

dos Santos et al. (2016).

Open education "aims to widen access and participation for everyone by removing barriers and making learning accessible, abundant, and customizable for all. It offers multiple ways of teaching and learning, building, and sharing knowledge. It also provides a variety of access routes to formal and non-formal education and connects." (p.5).





Open Education History

(Compiled based on various sources consulted: Blessinger & Bliss, 2016; Bliss & Smith, 2017; Stracke et al., 2022; World Economic Forum, 2020; Miranda, et al, 2023; MIT Press; OpenAI)

Late 1960s Efforts Began to Remove Educational Barriers 1969: The Open University of the United Kingdom 2008: "MOOC, Open Textbooks: 2002: UNESCO Open Educational Resources (OER) 2002: Lawrence Lessig, Hal Abelson, & Eric Eldred establish Creative Commons. 2008: "MOOC" was coined by Dave Cormier. The MOOC movement 2009: Open Textbooks: Open Textbooks Network, Open Textbook Network, Open Textbook Library.

Internet enables dissemination of educational content

- 1997: the MERLOT project to identify & provide access to mostly free online curriculum materials
- 1998: David Wiley coined the term "open content"

Late 1990s

COVID; Education 4.0; D2O; OpenAI LLM

- 2020 onwards: COVID & Open Education
- 2020: Education 4.0 & Open Education
- 2021: MIT press D2O (Direct to Open) project
- 2023: OpenAl released ChatGPT





Education 4.0 Core Components

(Miranda, et al., 2023)



Fig. 2. The four core components of Education 4.0 in higher education used as a reference framework

RESEARCH DATA MANAGEMENT LIBRARIAN ACADEMY Data Services Continuing I

Competency-Based Education; Definitions

Gervais. (2016); Sturgis & Casey. (2018).

 An innovative educational paradigm that promotes equity and empowers learners by enabling them to advance based on what they know and can do with high flexibility and individualized pathways to learning.

EDUCAUSE (2014).

 "CBE is built around clearly defined competencies and measurable learning objectives that demonstrate mastery of those competencies."

Book. (2014).

• CBE is "often seen as having the potential to address accessibility, affordability, transparency, and improved learning outcomes, all relevant to graduates' employability and strengthening of the workforce" (pp. 2-3). Students are empowered to make decisions about their learning experiences

Assessment is a meaningful for students that yields actionable evidence

3 Students receive timely, differentiated support based on their learning needs

Seven Components of CBE

5

6

(Marion, S., Worthen, M., & Evans, C. (2020). How systems of assessments aligned with competency-based education can support equity. Vienna, VA and Dover, NH: Aurora Institute and Center for Assessment.)

Students progress based on evidence of mastery, not seat time

Students learn actively using different pathways and varied pacing

Strategies to ensure equity are embedded in education systems

Rigorous, common expectations for learning are explicit and measurable

Data Competency Frameworks

- MLA's "Data Services Competency" (Federer et al., 2020)
- PLA, ALA, EL, and RIPL's "Data Competencies" (Chen et al., 2018)
- ARL's "Librarian's Competencies Profile for Research Data Management," (Schmidt & Shearer, 2016)
- IFLA's "Concept Data Science Framework for Libraries" (IFLA, 2018)
- Liber: Ten Recommendations for libraries to get started with research data management (LIBER Working Group, 2012)





MLA's Data Services Competency (2020)

Applies principles of data literacy

Basic: Finds, interprets, and manages data according to ethical principles.

Expert: Critically appraises data and data collection methods. Basic: Collects and uses knowledge of institutional and research context to initiate institutionally relevant data services.

services

data

advances

and

Establishes

Expert: Evaluates and expands upon existing data services by developing partnerships and becoming integrated into the institutional research environment. practices Φ ata lifecycl best data σ research the across Supports

Basic: Provides guidance on generalizable, domainagnostic research data best practices.

Expert: Identifies and implements domain-specific research data best practices.

Basic: Applies an understanding of scientific method and ethical and sound research practices to data-related problems, encouraging ctices open science practices when appropriate. pra

methods,

research

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Applies

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rigor,

and

ethics

Expert: Applies specialized knowledge of one or more scientific disciplines and research methods to advanced, domain-specific data-related problems Basic: Develops and delivers instruction to enhance data literacy and skills.

on data-

Provides training and consultation

topics

related

Expert: Provides customized discipline- and context-specific training on advanced datarelated topics, including those requiring computational approaches



Professional

Data analysis Data management Data processing Statistics Visualization

Data Science (DS) Graduate Education Curriculum: Competencies

(Zhang, et al. 2023. Data science curriculum in the iField. *JASIST, 74,* 641-662)



Personal

Solve real-world problems Practice literacy Support decision making Use tools Academic literacy



Practical

Understand needs Organizational skills Responsibility Entrepreneurship Continue learning

Data Science (DS) Education Current Offering: Skills

Programming Languages	Big Data Management Platforms	Operating System	Domain Theory
Python R SQL NoSQL SAS	MapReduce Spark Hadoop	Linux Unix	Library & information science theory Computer science theory Biological & medical scientific theory Business science theory Mathematical theory



Data Science (DS) Undergraduate Education Courses





(Zhang, et al. 2023. Data science curriculum in the iField. JASIST, 74, 641-662)



COMMUNITIES - PROFESSIONAL DEVELOPMENT - MEETINGS -

Professional Development

General Information		
Professional Competencies		
Continuing Education (CE)	0	
AHIP Credentialing		MLA
Specializations	0	nee
Mentoring		LOG
Research Training Institute		
Rising Stars Leadership		
Grants and Scholarships		Why Get a
Career Center		As research beco
For Educators. CE Planners	0	other health info

Data Services Specialization

With the skills acquired in earning a Level I DSS certificate, you'll be able to manage research data, provide guidance and instruction on data management best practices, and apply ethical data management principles.

With the skills acquired in earning a Level II DSS certificate (planned for the first quarter of 2024), you'll build upon your Level I skills and be able to appraise data and data collection practices, evaluate and expand data services, and develop domain-specific data expertise

TAKE ACTION - PUBLICATIONS -

FOR PATIENTS

DSS?

mes increasingly data-driven, libraries are expanding their data services. Health sciences librarians and rmation professionals are ideally situated in the research and information-seeking process to provide data services support.

DS Professional Education & Training

Examples in the U.S.:

- "Introduction to Research Data Services" program in 2023 (National Network of Library of Medicine)
- "Data Services Specialization" in 2021 (Medical Library • Association)

NNLM Research Data Management: The Charts are Off: Approaches to Ethical Decision- Making in Data Visualization	x			x		1
NNLM Research Data Management Webinar Series: What's in a Data Story?	x		x	x		1
Open Data Deidentification Tools	x				x	1
Putting the Quality in Qualitative: Tips for Evaluating Qualitative Research			x	x		1.5
R for All of Us: Basic Coding Training*				x	X	8
Research Data Management Librarian Academy (RDMLA)	X	x	x	x	x	16.5
Research Data Management Librarian Academy (RDMLA) Unit 1, Foundations of RDM	X		х			1.5
Research Data Management Librarian Academy (RDMLA) Unit 2, Navigating Research Culture				x		1.5
Research Data Management Librarian Academy (RDMLA) Unit 4, Launching Data Services		x				1.5
Research Data Management Librarian Academy (RDMLA) Unit 5, Project Management and Assessment		x				1.5
Research Data Management Librarian Academy (RDMLA) Unit 6, Data Analysis and Visualization Tools				x		1.5
Research Data Management Librarian Academy (RDMLA) Unit 8, Platform Tools	X					1.5
Research Data Management Librarian Academy (RDMLA) Unit 9, Delivering Data Management Training					X	1.5
Research Data Management Librarian Academy (RDMLA) Unit 11, Data Curation and Archiving	x			x		1.5

Gaps





RDMLA/DSCPE Project Timeline





RMLA

Global Open Education Program



What is RDMLA?



A free open education program offering individuals an opportunity to learn about research data management practices

RMLA **DSCPE**



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Currently 8.419 actively **learners**

Chinese



Developed in

partnership

with industry,

teams of

librarians and

LIS faculty

who have

expertise with RDM

15 partners &

growing...



Financially funded by Elsevier



CANVAS | NETWORK

RESEARCH DATA MANAGEMENT LIBRARIAN ACADEMY [RDMLA] Self-paced COURSE DATE: DURATION COMMITMENT:

Offer a Course | About Us | Take a Course | Login

		(CLASSIN
REQUIREMENT: None	COURSE TYPE: Self-paced	CREDENTIAL: Certificate; Cont Ed Credits (CEUs)



Co-Leaders, Instructors, and Project Staff





RDMLA Units and Sections



- The RDMLA currently offers *eleven units and two mini-modules*, which can be taken in sequence or out of order;
- An overview Final Assessment offers CE credit from Simmons University SLIS;
- Materials from Community Events, such as the RDMLA Symposium held in 2022, are also available.

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RDMLA Chinese Translation



- Translation Partner: National Taiwan
 University Library
 - Traditional Chinese language translation
 - Includes English to Traditional Chinese to Simplified Chinese glossary
 - Translation lead by Drs. Chen and Tang, with assistance from Chiu-Hsun Lin, Wen-Chi Huang, and Ching-Yi Lai
- Translation of Units 1 to 11 available
 on Canvas Network

Translation Teams (Professional titles during the time of translation effort)

NTU Library Translation Team





Kuang-hua Chen, Ph.D. Muh-Chyun Tang, Ph.D. University Librarian and Associate University Professor Librarian and Professor



Chiu-Hsun Lin Director of Research Support Division



Wen-Chi Huang **Research Support** Division



Ching-Yi Lai **RDMLA Project** Manager

RDMLA Translation Review Team



Rong Tang, Ph.D. RDMLA Co-Leader; Professor, **Simmons University**



Zhan Hu Doctoral Student, Simmons University



Elaine Martin, D.A. RDMLA Co-Leader; Director, Countway Library of Medicine



RDMLA Librarian,

Countway Library of

Medicine

Nicole Henry Student, Simmons University













Unit Content Segments Translated

利害關係人 - 專家訪談

<u>首直。第四里元。內容與活動。詳識利害關係人</u>。專家訪談



在「專家訪談」中,我們訪問了來自不同類型機構的專家,討論他們推行資料服務的經驗。所有受訪者將會保持匿名,但您可以在此瞭解他們如何與所屋機 構的利害關係人合作。

具體而言,我們問了這些問題:

• 推行資料服務時,應該考量哪些利害關係人?您在推行資料服務時,是否忽略了哪些利害關係人?

在影片中,我們以動畫呈現其中一位受訪者的回應。在影片下方的 PDF 文件中,我們彙整了所有受訪者對於利害關係人問題的回應。

點擊播放鍵以開始。



影片長度: 0:52 | 逐字稿 →

*註:出現在動畫影片中的受訪者,在訪款 PDF 中的編號為 NAPU5。編號代表受訪者線屬北美洲以衛主科學為主要關注領域的公共機構。您可以從本頁下方 的表格中獲得更多訪談系列中的受訪者資訊。

訪談彙整之 PDF 文件 : <u>利害關係人</u> →

RDM 實行 - 座談

<u>首直。第三章元</u>。內容典活動。<u>RDM 策路共責行</u>。責行座談



第二場座談會,我們邀請到其他同樣經驗豐富的館員,分享他們對實行研究資料管理的看法。目標在於讓學習者瞭解在提倡與推廣面書館 RDM 時有哪些常用做法。

本次的與會者: Ceilyn Boyd、Eric Albright、Mary Blanchard 舆 Rich Kaplan。

與會者回答的問題主要與下列議題相關:

RDM 編觀

您認為您所層的機構的哪些方面對圖書館RDM計劃的成敗有最大的影響?

合作夥伴與協作

- 您在關發和實施協作服務方面有什麼經驗?
- 您和哪些對象合作過,而這項服務最後是否成功?
- 就這次成功或失敗的服務而言,您認為最重要的影響因素為何?

助力

- • 誰是国書館 RDM 服務最有力的推廣者?您是如何培養這些人的?

RDM 計畫

- 您如何決定哪一項 RDM 服務和資源最有機會取得成功?
- 您在建立国書館 RDM 計畫時,是否普這還任何特定的人力配置挑戰?

障礙

- 在剛闢始推動 RDM 服務 · 您曾遭遭哪些障礙 ?
- 您認為啟動圖書館 RDM 計畫時,最有挑戰性的面向為何?
- 建立 RDM 服務後,您採取什麼策略以維持服務持續營運?

觀看本影片,看看來寶怎麼說。

點擊播放鍵以開始。



影片長度: 15:19 | 返字稿 →





Using CBE approach with a Hands-on Capstone Component



What is **DSCPE**?



Eight to ten week online intensive learning experience

their

institution

Preparing
early-to-mid
careerPilot Cohort &
Fall 2023
cohort ran in
Fall 2022 &
Fall 2022 &
2023
services at



Fall 2024 Cohort will begin September 2024 & conclude in December

Plan to expand the cohort by including Canadian representation All three cohort members' tuition covered by a generous gift from Elsevier

Data Services Continuing Professional Education (DSCPE)



Welcome to the Data Services Continuing Professional Education!

The Data Services Continuing Professional Education (DSCPE) fills a much-needed gap in professional development of practicing librarians. The objective of the curriculum is to train and develop a community of data service librarians.

This pilot cohort is funded through a gift from Elsevier.

In this Canvas course space, you will find all the information you need as you work through the educational content. If you have any questions as you navigate through, please contact the DSCPE Team.

- Dates: October 1 through November 30, 2022
- Meeting Location: Online/Remote
- DSCPE Leaders: Elaine Martin, D.A. and Rong Tang, Ph.D.
- DSCPE Contact: dscpe.info@gmail.com



The Data Services Continuing Professional Education (DSCPE) is a partnership between the Research Data Management Librarian Academy (RDMLA), Countway Library of Medicine at Harvard Medical School, and Simmons University School of Library and Information Science.

DSCPE

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DSCPE Learning Objectives



To train and develop a community of data services librarians



Have students gain familiarity with the foundations and best practices of providing data services within a library

Use a CBE/CBT approach to content delivery



Gain practical skills of delivering those services to enhance their existing work and future career goals





& 2022

Observations of the 2022 vs 2023 Cohort

2022 Cohort

- Focused on learning KSAs to meet the NIH DMSP requirements
- Many wanted to learn to do DMP based on NIH mandates
- Compared to 2023, deliverables more focused on NIH DMSP, generated more reports/market plans/proposals, and learning about data services.
- The final practical outcome was several students obtained a new position in data services

2023 Cohort

- Consisted of librarians who were already in the data services position or librarians working in small libraries wishing to be part of the DS community
- Many wanted to learn how to establish a data service in their library and what to offer specifically as a service.
- The 2023 capstones deliverables have shown moving towards conducting needs assessment and/or pursuing research (including prep for IRB) in the area of data services, as well as data acquisition and licensing. For the latter, it might indicate that library's data services are moving to the direction of "data as a collection."
- The final practical outcome is students were able to dive deeper into specific dimensions of data services, including DMPTool, research and analysis, and data licensing.



Mentor

"Overall great experience and I highly recommend this experience to others. I would certainly do it again!"

"This was less of a mentorship experience and more of a "co-thinking"/colleague interaction, which was great. The data system is new to our institution, so the student and I were learning and exploring together!"

Selected Comments from 2023 mentor and student

Students

"In depth DMP understanding, DMPTool administration, supporting researchers with DMPs and doing RDM trainings to various groups."

"Most appreciated and valuable was the opportunity to attend meetings of team at the capstone site. Seeing how a team that is immersed in the work thinks, talks, and strategizes about it was the most valuable part of the capstone experience."



Lessons Learned



Lessons Learned with RDMLA



Content

- Content development & update
- Pedagogical usability evaluation

RMLA **DSCPE**

Translation effort & quality assurance tests



Platform

- Learning units' production, implementation, updates, and maintenance
- Production of minimodules & community resources
- Limited learning analytics



Learner Challenges

- Content learnability
- Competency establishment and improvement
- Retaining the knowledge and applying to the practice

Challenges with DSCPE

- Working Professionals with varying levels of experiences/skills
- Time management balancing between work and the program requirement
- Knowledge and experience gaps
- Confidence, personality, and perseverance

- Projects vary from well-defined to ill-defined
- Institutional culture
- Expectations
- Mentoring styles
- Project deliverables



Capstone Projects

Cohort





RDMLA and DSCPE Next Steps



Review and update content in the eleven full RDMLA units Potential RDMLA Spanish translation Effort



Develop new RDMLA modules or mini-modules on topics such as research methods; data licensing; data and AI; and international data sharing policies



Prepare for Fall 2024 DSCPE cohort

- Recruit more students from outside health science libraries
- Potentially expand outside of the U.S.
- Further diversify the applicant pool



Conclusion

RDMLA/DSCPE's use of global open education platforms & CBT via online fits working professionals learning needs RDMLA/DSCPE are successful examples of community-based collaborative innovation in data services training for working professionals.

Data Services is an evolving field, training needs to reflect ongoing changes of services offering to fill the gaps

2023 program sees the growing needs in research methods training as well as data acquisition and licensing skills

RDMLA/DSCPE will expand its offerings to respond to the demand from the field

RDMLA 2.0



Open Discussion Questions

1. Do Taiwan's iSchools have a program or courses on Data Science or Data Services? If yes, what kind of competencies and skills are covered?

2. What do you think are good future topics for RDMLA or DSCPE to address?



