

THE ITERATIVE ENGAGEMENT BETWEEN CURATION AND EVALUATION IN AN OPEN RESEARCH PROJECT: A UTILIZATION- FOCUSED APPROACH

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The iterative engagement between curation and evaluation in an open research project: A utilization-focused approach

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Abstract

The Research on Open Educational Resources for Development (ROER4D) project, funded by the International Development Research Centre (IDRC), was launched in August 2013 to undertake research on the use and impact of OER specifically in the Global South. The project has made a commitment to undertake *open research* as far as possible. This can be considered a challenge even in a small project and is amplified due to the size and complexity of the ROER4D project, with 18 sub-projects being undertaken in 26 countries across Southeast Asia, Sub-Saharan Africa and South America. Sub-project activities are coordinated and supported by the ROER4D Network Hub, based in Cape Town, South Africa and Penang, Malaysia to address the specific project objectives which include the curation of research documents produced and data collected as open data.

ROER4D, therefore, needs strong but flexible strategies in place to meet its objectives. Due to the ground-breaking nature of the research work, the *open* principle and the many challenges of curating documents and data openly, it is critical for any strategy to be able to change and adapt quickly, if required. The project's evaluator, in close communication with the ROER4D Network Hub, needs to provide timely indications of where these changes may be needed. The key importance of the curation component of the ROER4D project puts it in a prime position to benefit from the evaluation, which uses a utilization-focused evaluation (UFE) framework (Patton, 2008). This paper will outline the ROER4D project's curation strategy and the evaluation of this project objective and analyse how this interacts with the development of the evaluation plan. Opportunities and challenges of developing and evaluating a curation strategy for such a large-scale open research project will also be highlighted.

Introduction

Curation in research

Curation has often been an invisible area in research. Commercial publishers have typically been responsible for long-term storage and accessibility of research outputs, while researchers and research projects have rarely considered it part of their responsibility (Monastersky 2013). While this approach has sufficed for traditional book- and journal-based outputs, research projects often produce a range of non-traditional outputs – working papers, policy briefs, media pieces, etc. – that also have to be stored and curated to ensure that they are accessible for future scholarship.

Additionally, the very process of research publication is being examined. In the traditional model of scholarship, drafts, planning or conceptual documents or initial data sets are rarely shared during the course of the project or indeed at all (Tenopir et al. 2013). However, *researching in the open* - the practice of releasing interim or draft outputs, early data sets and project planning documents during the course of project activity - requires that researchers and projects take control over curating their own outputs and data. This new way of looking at the research process emphasises not only cost- and barrier-free access to the final research outputs, but also greater transparency and openness in conducting the research itself. This highlights a change in the types of research products that are communicated, organised and stored, with some or all of the procedural documents and even initial (cleaned and anonymised) datasets being shared. A change in the timing around sharing is also occurring in order to engage research audiences early and comprehensively with the process, and not only the products of the research. The volume of outputs and issues of version control and the clear indication of what is an interim versus a final output require a strategic engagement on how project resources are organised, stored and made available to the public.

The case of ROER4D

One such project that has embraced the principle of researching in the open is the Research on Open Educational Resources for Development (ROER4D) project. Funded by the International Development Research Centre (IDRC), ROER4D was launched in August 2013 to conduct research on the use and impact of OERs specifically in the Global South. There are 18 sub-projects under the ROER4D umbrella project being undertaken in 26 countries across Southeast Asia, Sub-Saharan Africa and South America. Study sites are spread over 16 time-zones and researchers speak many different languages between them. Sub-project activities are coordinated and supported by the ROER4D Network Hub, based at the University of Cape Town in South Africa as well as at Wawasan Open University in Penang, Malaysia.

The project's main aim is to inform educational policy and practice in developing countries through its research findings on possible ways in which and under what circumstances OER may address the key educational challenges. The specific project objectives are to:

- (1) build an empirical knowledge base on the use and impact of OER in education;
- (2) develop the research capacity of OER researchers;
- (3) build a network of OER scholars; and
- (4) communicate research to inform education policy and practice.

In order to fulfil these objectives successfully and to foreground open sharing of the ROER4D research, an additional objective was explicitly added during the preparation of the project's first technical report in August 2014 (Hodgkinson-Williams & Cartmill 2014), namely, to:

(5) curate research documents produced and data collected as open data.

Curation in the ROER4D project and the development of the curation strategy have, thus, been recognised as a foundational part of the project's research process. The development of a coherent plan for curation and storage of documents is vital for any project that wants to ensure that their research resources are being stored, managed and shared effectively, but specifically for those researching in the open.

Curation in the ROER4D project

ROER4D's commitment to undertake open research as far as possible, which can be considered a challenge even in a small project, is amplified due to the size and complexity of the ROER4D project (Figure 1).

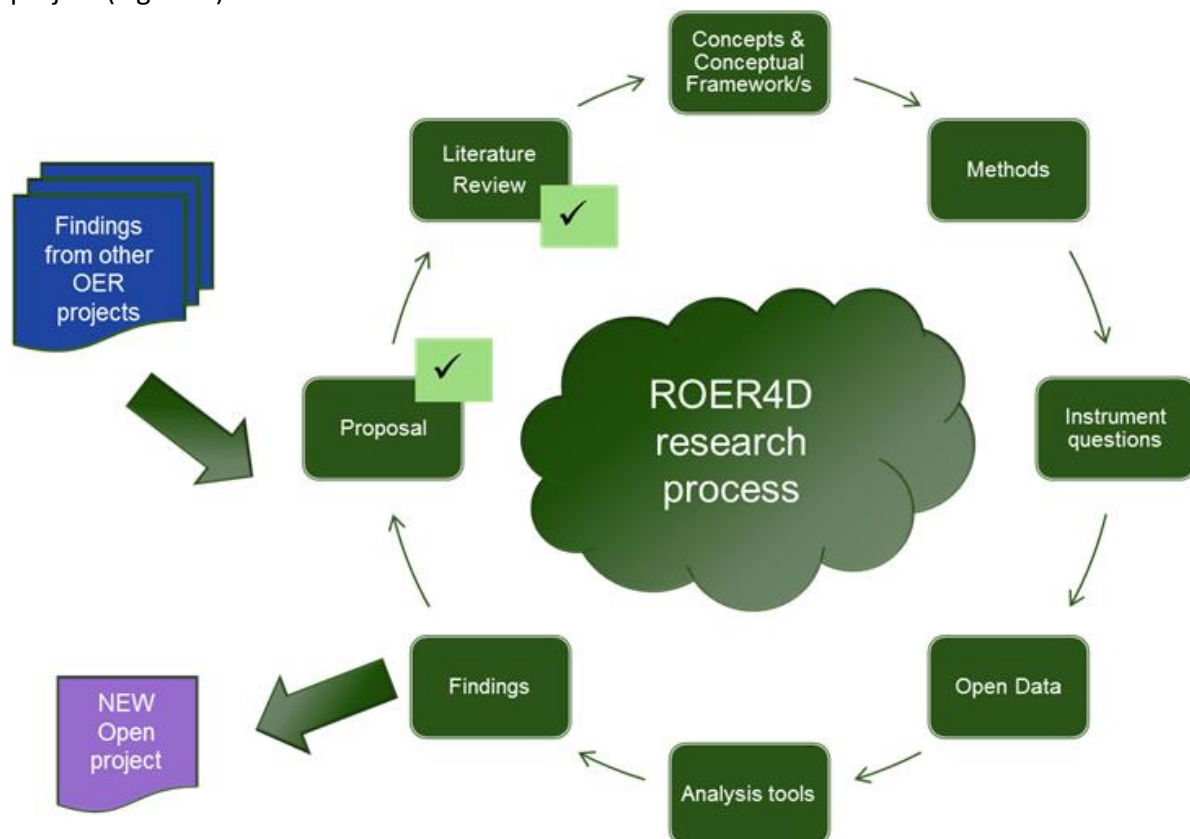


Figure 1: The outputs which ROER4D intentions to share as a part of it's open research process. Ticks in green boxes indicate outputs that have already been shared. (Adapted from: Hodgkinson-Williams & Arinto 2014; licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/))

The decision to take an open approach has a considerable influence on the curation strategy and how it is shaped (Figure 2).

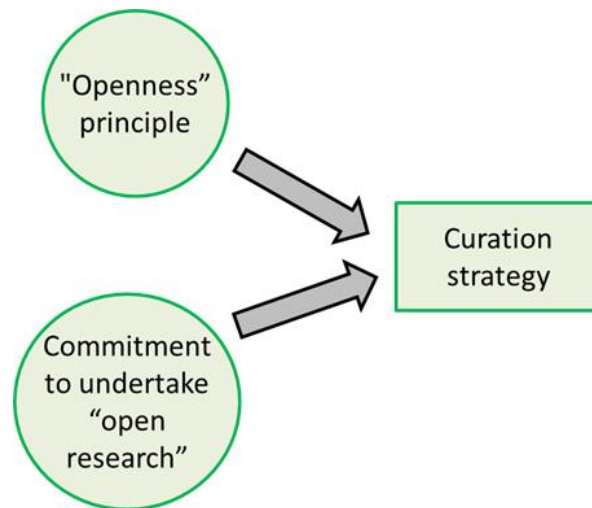


Figure 2: "Open" influences on the curation strategy.

The development of ROER4D's curation strategy began in early 2014 to address the numerous challenges of organising, describing and storing the range and scope of outputs and interim documents that the project intended to produce. Specifically, ROER4D's commitment to researching in the open required that interim outputs be released as soon as possible (and be revised periodically) so that the research team could engage with their audiences during the course of the project, rather than only after the research had been completed. The project required a curation plan that allowed for control over the curatorial process, maximising the potential accessibility and utility, while still providing safe and secure storage of project documents and data in the short, medium and long term. In order to receive timely, relevant and useful feedback on the curation strategy, this project objective forms part of ROER4D's evaluation strategy.

Evaluation in ROER4D

Evaluation is a process of something's value, worth or merit (Scriven, 1991, p.4). This can involve, in the case of a project, measuring its effects against its specified goals or examining its processes in a meaningful way that can feed into decision-making about improvement. Evaluation of the ROER4D project was part of the project's methodology from the scoping stage (Hodgkinson-Williams, 2013). ROER4D works with the Developing Evaluation and Communication Capacity in Information Society Research (DECI-2), which is also an IDRC-funded project. DECI-2 assists with the evaluation of the project by providing mentoring to the project's local evaluator in a Utilization Focused Evaluation (UFE) approach. The UFE approach is underpinned by the "premise that evaluations should be judged by their utility and actual use" (Patton, 2008, p. 37). Intended use of the evaluation findings by intended users is central in the UFE approach (Patton, 2008; Ramirez & Brodhead, 2013). The local evaluator works with the ROER4D Network Hub to develop and implement ROER4D's evaluation strategy. Since ROER4D's evaluation work started at the beginning of 2014, there has been a change in the person filling the evaluator role with a new evaluator starting in September 2014. Much development of the evaluation strategy has taken place between September 2014 and February 2015.

Scope of evaluation

The evaluation work is specifically focused on four of the five project objectives (2 - 5 listed above):

- (2) Develop the capacity of OER researchers
- (3) Build a network of OER scholars
- (4) Communicate research to inform education policy and practice
- (5) Curate research documents produced and data collected as open data

Objective 2 and 4 are the main evaluation priorities for the project and the evaluation work focuses on the ROER4D Network Hub activities associated with these objectives. Due to the resources available, not every aspect of these objectives is being evaluated, with evaluation focuses being determined in collaboration with the Network Hub. To facilitate this, the evaluator needs to understand the scope of the project objectives, what it is most critical to evaluate from the perspective of the intended users and be able to adjust this going forward as needed as the UFE work is iterative by nature (Patton, 2008; Ramirez & Brodhead, 2013). In collaboration with the ROER4D Network Hub, the evaluator then formulates an evaluation plan, including what to evaluate (key evaluation questions) and how to do this (methods and measures). The experience of the evaluation process and the effect this has are also key components of the evaluation. Feedback is received from DECI-2 at various stages and this is incorporated into the process. Where needed, the evaluator connects with the ROER4D sub-projects to, for example, conduct surveys and interviews. The findings are shared with the Network Hub and other defined stakeholders timeously to allow the findings and recommendations to effect change as soon as possible, where possible.

While curation is not one of the two main evaluation priority areas for the project, it has been recognised as a foundational component in ROER4D's research process. It is also an interesting example of both the opportunities and challenges of the iterative nature of the UFE process and how this has fed into the curation strategy. The iterative nature of the development of the curation and evaluation plans is explored in the next section.

Design & Implementation of the Curation and Evaluation Practices

ROER4D's Curation Plan

The core components of the curation strategy include:

- *Open access repository and other curation spaces:*
A multi-platform hosting approach is used to ensure maximum longevity, security and accessibility of project outputs (see Table 1), specifically including:
 - A closed-access curatorial space for internal communications, raw (pre-anonymisation) data, and other confidential documents or products (a customised version of *Sakai* for the University of Cape called *Vula*, which means *open* in the local Nguni language);
 - An open-access repository, equipped with automated backup and persistent identifier capabilities, to ensure long-term, barrier-free access to the final project outputs (OpenUCT¹ - the UCT Institutional repository)
 - Multiple storage and dissemination platforms to ensure the largest possible audience is reached (OpenUCT, FigShare², Zenodo³, SlideShare⁴, Google Docs; ROER4D Website⁵)

¹ <http://open.uct.ac.za/>

² <http://figshare.com/>

³ <http://zenodo.org/>

⁴ <http://www.slideshare.net/ROER4D>

- Metadata:**
 Rigorous use of metadata according to international curation guidelines (NISO 2004) is proposed to allow for interoperability and automated harvesting by other OER aggregators and portals (such as the Open Education Consortium⁶ or OER Commons⁷). Curation of rich resources is also facilitated through the metadata schema by allowing the association of reports, articles or other outputs with attached data, in order to practise truly open research.
- Output licenses:**
 The use of open licenses on project outputs to enhance the (re)usability of outputs, and the use of open formats to ensure maximum accessibility by both human users and automated aggregators and data-miners.

Table 1: ROER4D curation platforms and their capabilities grouped by function.

Platform	Function	Capabilities
Content Management System (Sakai - Vula)	Long-term, private and secure storage of project document drafts, raw data and confidential/internal documentation	Security Privacy Long term curation
Open access repository (OpenUCT)	Long-term, open access to project outputs and linked data	Security Metadata Accessibility Long-term curation
Curation spaces: 1. FigShare, Zenodo 2. SlideShare	Short to medium-term access to: 1. Project outputs and linked data 2. Presentations	Security Various levels of metadata Broader accessibility Short to medium-term curation
Cloud-based Collaboration Platform (Google Docs)	Collaborative creation and editing of documents; sharing of interim documents and documents under development	Accessibility Ease-of-use Simultaneous creation, editing and commenting on documents
Website (http://roer4d.org) which uses Google Analytics to track traffic to the website	Central portal to curation and communication platforms	Accessibility Ease-of-use Adaptability/ flexible presentation

Curating and releasing outputs and data as they become available is also a key feature of the curation strategy. The earliest possible release of outputs helps to ensure their relevancy and usefulness to the research community. However, this is not a common practice in the research community as outputs are usually only released near the end or on conclusion of the project.

⁵ <http://roer4d.org/>

⁶ <http://www.oeconsortium.org/>

⁷ <https://www.oercommons.org/>

The curation strategy is still under development, as curating in the open requires an agile, flexible approach. One of the current core challenges of the curation strategy development is to ensure data accessibility by both humans and machines, complicated by the fact that ROER4D sub-projects will collect qualitative as well as quantitative data. Feedback from the sub-projects, other OER researchers and curation specialists will inform how best to modify the strategy going forward to ensure maximum security, accessibility and use of project resources both during and after the project. The evaluation of ROER4D's curation of research documents produced and data collected as open data will also be able to provide useful feedback to the curation process.

Evaluating curation

The main key evaluation question (KEQ) for curation is:

Has all ROER4D documentation and research output been curated as open content?

Both this main and the sub-KEQs (See Table 2 below) were developed in consultation with the Network Hub, especially in collaboration with the person responsible for curation. The evaluator then suggested potential evidence and measures which would be able to answer the KEQs in order to prepare the evaluation strategy. This has been an iterative process that is still ongoing and has run in parallel with the development of the curation strategy to some extent. The development of the curation strategy has informed the evaluation plan and evaluation considerations have fed back into shaping the curation practice (Figure 3).

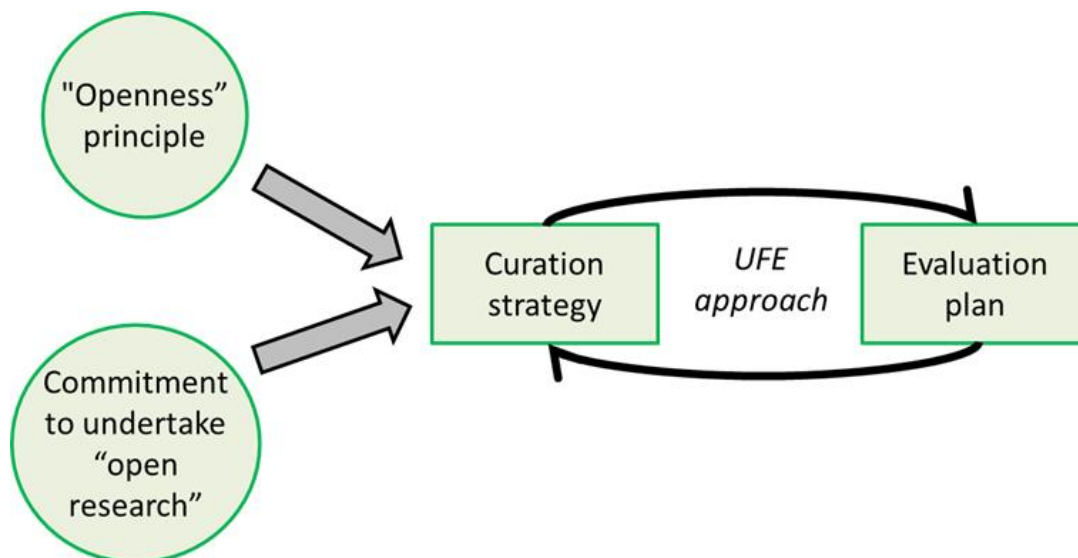


Figure 3: The iterative connection between the curation strategy and the evaluation plan.

In terms of curation, the evaluation strategy focuses on measuring ROER4D's curation against best practice and international standards, such as those outlined in various comprehensive data management guides and checklists produced by the Digital Curation Centre (DCC, 2013). This evaluation would involve gathering data from users of the curated outputs as well as collecting evidence of access to the outputs over time from the current curation platforms. Table 2 (page 8) represents the current plan to evaluate ROER4D's curation objective. This includes the uses for the findings identified by the Network Hub, KEQs and the evidence to be collected to address each KEQ.

As the curation strategy is still in development, the plan to evaluate the objective is preliminary at this stage. As the exact curation processes and procedures are finalised, checklists with reference to international standards and best practice can be developed and additional measures for the range of curation platforms may be included to provide evidence. The nature of the UFE approach allows for agreed-upon changes to the evaluation plan in response to new and developing project needs. Discussion between the evaluator and the curator has been useful in helping to shape the curation strategy, indicating that the UFE process in itself is contributing positively to the refinement of the curation strategy and processes. Going forward, further planning and implementation will be followed by monitoring and evaluation to provide feedback. The iterative and collaborative nature of curation-evaluation work has presented several opportunities and challenges which will be explored below.

Table 2: The ROER4D evaluation plan for evaluating the curation objective.

	Use(s)	KEQ(s)	Evidence		What will measured
Objective 5: Curate output as open content (outputs = documents and data)	To: - better curate the content. - ensure ROER4D is using the best metadata standard across outputs. - determine if it is productive to produce multiple forms of outputs, such as releasing documents in OpenOffice formats. - focus on increasing the metadata richness of the other content hosting spaces and ensure cohesion across platforms.	5.1.1 How well is our own research curated in order to be shared? 5.1.2 Where is the research that has been curated and shared getting the most hits?	Measure against metadata standards best practice - process review; Views and downloads	Measure against the e.g. Digital Curation Centre's (DCC) standards of best practice: Checklist for data management plan, etc	Process of curation of documents and data against checklist
				Monitor curation spaces to gather views and downloads data	From the OpenUCT publically available statistics: Views and downloads
				From the Vula password-protected statistics: Views and downloads	
				From the SlideShare notification emails: Views, downloads, favourites, embedded views, comments, tweets, likes	
	From Google Analytics data: Hits for content, from where (Country, City)				
	To: - better curate the useful research list(s) that ROER4D shares	5.2 How well do we assemble other research to inform our own ROER4D researchers and other researchers?	Opinions of the users	Surveys and/or interviews	Use of the e.g. bibliography (survey questions to be developed)
To: - assess how open ROER4D's curated outputs are	5.3 How 'open' are ROER4D project documents, including both network hub outputs and any sub-project documents curated by the network hub?	Measure against checklist of: format, license, degree of granularity, quality/ comprehensiveness of metadata	Measure against open standards set by international standards and adopted by the project	Process of curation of documents and data against checklist	

Results and Lessons Learnt: Opportunities and Challenges

Several challenges and opportunities of developing and evaluating a curation strategy in a large-scale open research project that can provide insights for other projects have emerged from examination of the engagement between ROER4D's curation and evaluation work.

Challenges

- *Readiness and Adaptability:*
Deciding when to be open is a critical part of the curation strategy. How and when to curate different versions of outputs is also a consideration. This in turn influences what can and should be evaluated in terms of measuring how open ROER4D's curated outputs are. As the curation strategy is further developed, the evaluation plan will need to adapt to any changes and possibly expand to consider more uses and questions.
- *Cohesiveness:*
To ensure the best uses of resources, cohesion across platforms must be taken into account in curation planning and documentation. A degree of document reworking to conform to different software systems and their metadata standards comes into play here as well as planning which outputs should be shared on which platforms and when. In evaluating this, understanding which types of documents should be shared where and why is critical to drawing up appropriate measures to gather evidence.
- *Vulnerability/Instability:*
Third-party curation platforms (e.g. Slideshare) can potentially be bought by commercial entities, change their terms of service or start charging for analytics data. In planning to evaluate where the ROER4D curated documents are being accessed most often, analytics data is a key component of the evidence but it is vulnerable. Extracting data from third-party platforms at regular intervals should form part of the evaluation planning.

Opportunities

- *Transparency and Adaptability:*
The open and inclusive team dynamic of the Network Hub bolsters both the evaluation and curation activities as the team is very willing to share, discuss and reflect on the project's processes and work. As the project evolves, new activities and outcomes related to the objectives will likely provide new windows of insight into the project and how curation should be taken forward. Being prepared to capitalise on these insights by incorporating them into the curation and evaluation processes would benefit the project as a whole.
- *Reciprocity:*
As none of the objectives are being evaluated in isolation, the curation work stands to benefit from the other components of evaluation work being undertaken. There is a particularly strong interaction with the communication objective evaluation, as good curation underlies what is possible with a successful dissemination and communication strategy. Discussing measures, evidence and findings overlaps with both the curator and communications advisor would help to streamline the evaluation work associated with these two objectives.
- *Accessibility, Adaptability and Discoverability:*
Multiple platforms and output formats (e.g. open formats) will be used for curation to reach the broadest audience. As a part of this strategy, the OpenUCT Institutional repository is the long-term, open access point from which final project outputs will be accessed. Evaluation findings of which platforms and formats are the most accessed can help to streamline the curation strategy and make the best use of resources.

Building on the demonstrated integrated nature of the curation and evaluation work, the table below (Table 3) links the curation platforms and their functions to the currently proposed available evaluation measures and the uses for the data these measures will generate (elements of Table 1 & 2). This explicitly links the curation platforms and functions to data that can be collected and used to feed back into the project and provides an overview that can be used to identify further opportunities as well as gaps.

Table 3: ROER4D curation platforms linked to available evaluation measures. Curation columns are highlighted; evaluation columns are not highlighted.

Curation Platform	Platform Function	Relevant KEQs	Evaluation measures	Uses for the evaluation results
Content Management System (Sakai)	Long-term, private and secure storage of project document drafts, raw data and confidential/ internal documentation	5.1.1 How well is our own research curated in order to be shared? 5.1.2 Where is the research that has been curated and shared getting the most hits?	Measure against the e.g. DCC standards of best practice Available statistics: Views and downloads	- better curate the content. - ensure ROER4D is using the best metadata standard across outputs. - determine if it is productive to produce multiple formats of outputs - ensure cohesion across platforms.
Open access repository (OpenUCT)	Long-term, open access to project outputs and linked data	5.1.1 How well is our own research curated in order to be shared? 5.1.2 Where is the research that has been curated and shared getting the most hits?	Measure against the e.g. DCC standards of best practice Available statistics: Views and downloads	- better curate the content. - ensure ROER4D is using the best metadata standard across outputs. - determine if it is productive to produce multiple formats of outputs - ensure cohesion across platforms.
Curation spaces: 1.FigShare, Zenodo 2.SlideShare	Short to medium-term access to: 1.Project outputs and linked data 2.Presentations	5.3 How 'open' are ROER4D project documents, including network hub outputs and sub-project documents curated by the hub?	Measure against open standards set by international standards and adopted by the project	- assess how open ROER4D's curated outputs are
Cloud-based Collaboration Platform (Google Docs)	Collaborative creation and editing of documents; sharing of interim and developing documents	Not being evaluated		
Website (roer4d.org)	Central portal to curation and communication platforms	5.1.1 How well is our own research curated in order to be shared? 5.1.2 Where is the research that has been curated and shared getting the most hits?	Available Google Analytics data: Hits for content, from where (Country, City)	- better curate the content. - ensure ROER4D is using the best metadata standard across outputs. - determine if it is productive to produce multiple formats of outputs - ensure cohesion across platforms.

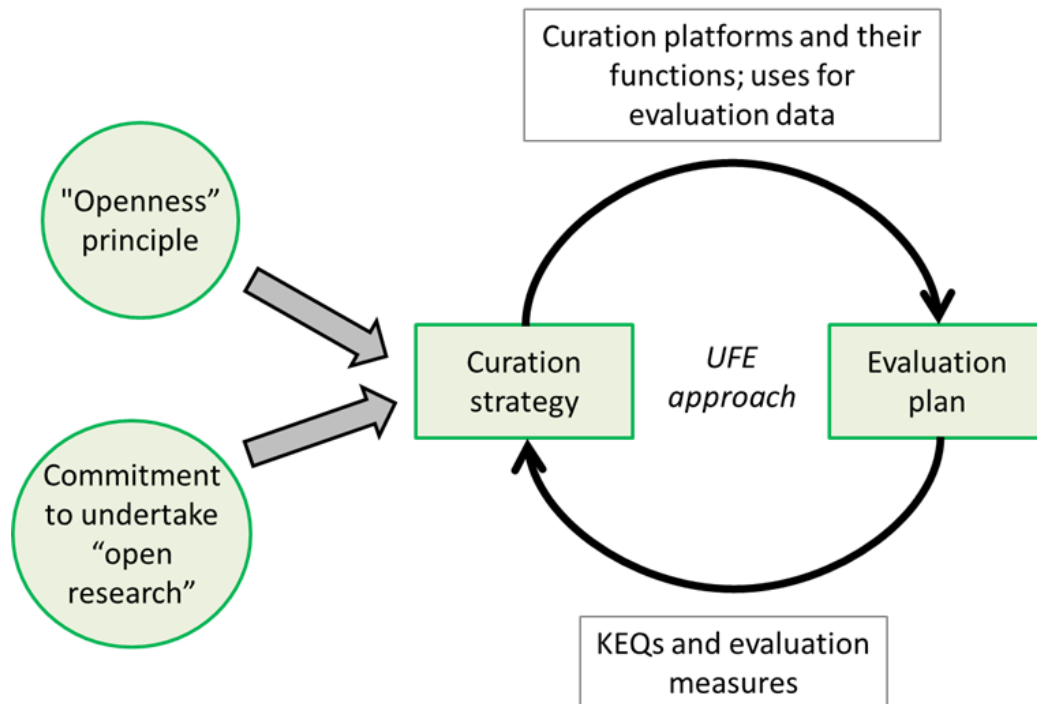


Figure 4: The links between the curation strategy process and the evaluation plan process

Linking elements of the project's curation strategy explicitly to the evaluation plan (Table 3; Figure 4) and discussing these linkages, data and uses with the Network Hub as well as being prepared to adapt the curation strategy and the evaluation plan to optimise the project all contribute to the making the most of the opportunities and minimising the challenges of developing and evaluating a curation strategy in a large-scale open research project. This integrated and responsive approach fits well within the UFE framework and can provide useful formative feedback to the project.

Conclusion

Good curation of content, including documents and data, should be a foundational step where any online (and offline) sharing will be undertaken. In open education, distance and eLearning initiatives where online sharing is a key component there are many opportunities for research on and learnings from what works well or not so well to positively influence practice. The experience of the ROER4D project's use of UFE in evaluating their curation objective can help inform researchers and educators on how best to incorporate feedback into the management of their own curatorial platforms.

What qualifies as *good* curation should ideally be tied to and influenced to some extent by end-user utility, international best-practice standards and tracking measures to ensure that curated outputs are actually being used and used as intended. Too often curators can work only according to manuals or guidelines without the input of critical assessment throughout the process as to whether or not the platforms, techniques and structures they create and use are valuable to the end-users of the curated data.

Implementing a UFE approach to curation in the ROER4D project allows for a framework of monitoring appropriate indicators to be put in place to inform what is actually working and what

is not. The collaborative and iterative approach of the curation and evaluation work has already been seen to help facilitate use of the evaluation process by the ROER4D Network Hub, who are the intended users. The ROER4D project will continue to record the iterative engagement between curation and evaluation as the project goes forward in order to share further learnings and insights with the research community.

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