

# OPEN RESEARCH HANDBOOK

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# GO-GN

# Open Research Handbook

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Editor's Introduction	7
Acknowledgements	9
How to use this Handbook	13
Research Methods Handbook	15
Introduction to Research Methods	15
Conceptualising Research Methods	16
Ontology	17
Epistemology	18
Axiology	19
Research Paradigms	21
Paradigmatic Methods	22
Positivism / Post-positivism	22
Interpretivism	23
Critical / Transformational	26
Pragmatism	26
Multidisciplinarity, Interdisciplinarity, Transdisciplinarity	28
Mixed Methods & Triangulation	29
Researching Open	30
Open Research Cycles	30
Open Practices	32
Designing a Research Project	34
Ethical Issues	35
Managing Risk	36
Using Technologies	37
Self Management	39
Research Design	39
Research Method Insights from the Global OER Graduate Network	41
Action Research and Participatory Action Research	41
Case Study	43
Content Analysis and Thematic Analysis	44
Design-Based Research and Interventions	45
Discourse Analysis	47
Ethnography	48
Evaluation Research	50
Experimental and Quasi-experimental Research	51
Grounded Theory	52
Interviews & Focus Groups	55
Literature Review, Systematic Review and Meta-analysis	58
Mixed Methods	59
Narrative Research	63
Observation (Naturalistic & Analogue)	63

Phenomenography	63
Phenomenology	66
Social Network Analysis	68
Surveys & Questionnaires	70
Conclusion & Reflection Prompts	75
Conceptual Frameworks Guide	77
Introduction	77
What is a 'Conceptual Framework'?	77
Conceptual Frameworks and Research Perspectives	79
Positionality	83
Conceptual Frameworks as Underpinning Constructs	85
Deconstructing the 'Concept'	89
Social Network Analysis and Conceptual Frameworks	92
Use Cases for Conceptual Frameworks	94
Conceptual Frameworks and 'Doctorateness'	97
New and Existing Conceptual Frameworks	98
The Role of Openness	103
Conceptual Frameworks Overview	107
Activity Theory	107
'Big' and 'Little' OER	108
Boundaries	110
Capability	112
Cathedral/Bazaar	112
Community	114
Connectivism	116
COUP Framework	117
Design Thinking	118
Diffusion of Innovations	119
Equity	121
Learning Analytics	123
Linguistic Accessibility	124
MOOC Accessibility	126
MOOC Learner-Centred Outcomes	127
MOOC Knowledge Framework	128
Network Theory	129
OER Adoption	129
OER Impact	130
OER Reuse	131
Online Collaborative Learning	132
Online Engagement Framework	133
Open Educational Practices	133
PRAXIS Framework	135

Rhizomatic Learning	137
Social Justice	137
Social Realism	140
TPACK Framework	141
Unified Theory of Acceptance and Use of Technology (UTAUT)	142
Value Creation Framework	143
Brief guide to additional Theoretical Frameworks	144
Learner Transitions and Experiences	144
Identity development and Selfhood	145
Pedagogies	146
Curricula	147
<b>Social Learning</b>	148
Sociological Theories of Power	149
Decolonisation / Postcolonialism	149
Mobilities	150
Conceptual Frameworks: Advice from the Front Line	150
Conclusion & Reflection Prompts	155
10 Problems with Theoretical/Conceptual Framing	158
Bordage's key points for using Conceptual Frameworks	159
Conceptual Framework Tips Sheet	159
Research Design Template	162
GO-GN Research Review	164
Accessibility	165
Adoption Studies	173
Innovation	179
MOOCs	181
Open Ecosystems	188
Open Educational Practices	192
Open Educational Resources	210
Open Educational Resources - Impact	219
Open Educational Resources - Theory	226
Open Pedagogy	229
Quality	243
Social Justice	245
Technology and Infrastructure	250
Additional Resources	255
Open Research Overview	256
Open Research	256
Open Practices	258
Open Licences	259
Open Data	261
Open Peer Review	265

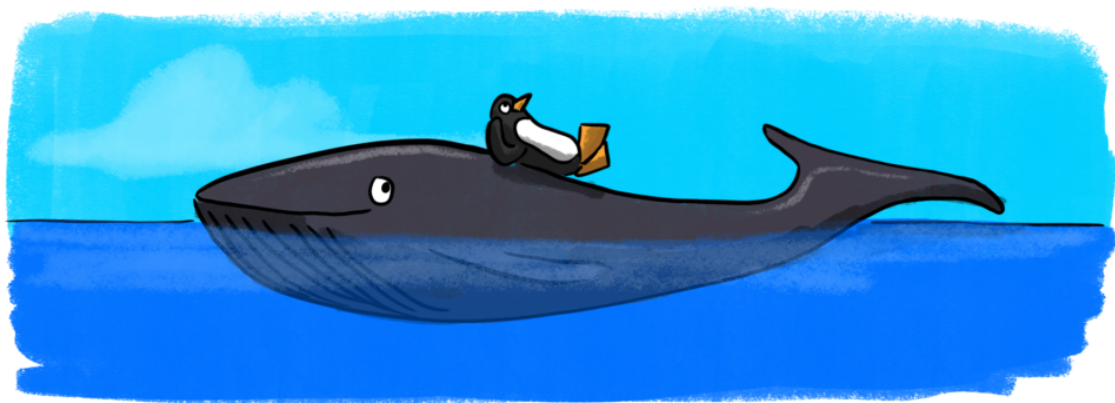
Reproducibility	267
Open Collaboration	269
Open Research Culture	272
Additional Resources	274
OER Knowledge Cloud	275
OER Research Toolkit	276
COUP Framework	277
Guidebook to Research on OER Adoption	280
An Open Education Reader	282
Online Learning Toolbox	283
Open Research (P2PU)	284
Understanding Openness	285
Ethics in the Open	294
Open Dissemination	308
Reflecting in the Open	319
References	325

## Editor's Introduction

This Handbook draws together work done between 2020 and 2023 by members of the Global OER Graduate Network (GO-GN). GO-GN is a network of PhD candidates around the world whose research projects include a focus on open education. These doctoral researchers are at the core of the network; around them, over two hundred experts, supervisors, mentors and interested parties connect to form a community of practice that:

- Raises the profile of research into open education
- Offers support for those conducting PhD research in this area
- Develops openness as a process of research

GO-GN is currently funded through the OER programme of [The William and Flora Hewlett Foundation](#) and administered by the [Open Education Research Hub](#) from the [Institute of Educational Technology](#) at The Open University, UK.



In our current phase of activity, we began these collaborative writing efforts with a Research Methods Handbook which was created during the depths of the Covid-19 pandemic. Working together at distance provided an important way to strengthen community links when meeting in person was not possible. The [Research Methods Handbook](#) was well received by a much larger audience than we anticipated, and went on to win an [Open Research Award](#). We followed this up with a sister publication, our [Conceptual Frameworks Guide](#). This explores a less well traversed (but nonetheless important) area of scholarly focus. Together, these two explore open approaches to the theory and practice of research in open education. One distinctive feature of our presentation is to foreground the authentic experiences of doctoral researchers who have used specific approaches in researching open education. While it is not possible to cover all approaches in this detail, we hope that important insights are presented in this form of open practice.



Throughout 2020-2022 we also regularly engaged our membership through collective reviews of recently published papers and articles. The [Research Reviews](#) serve as an overview of recent research but also as a snapshot of the critical responses recorded by doctoral and post-doctoral researchers working in relevant areas.

No one volume can claim to comprehensively contain the diversity and variety of open approaches, and this is no exception. But one virtue of openness is that we can draw on the openly licensed works of others to increase our coverage of relevant areas. The [Additional Resources](#) at the end of this volume bring together a range of openly licensed texts on open education research and suggests places for further reading and research.

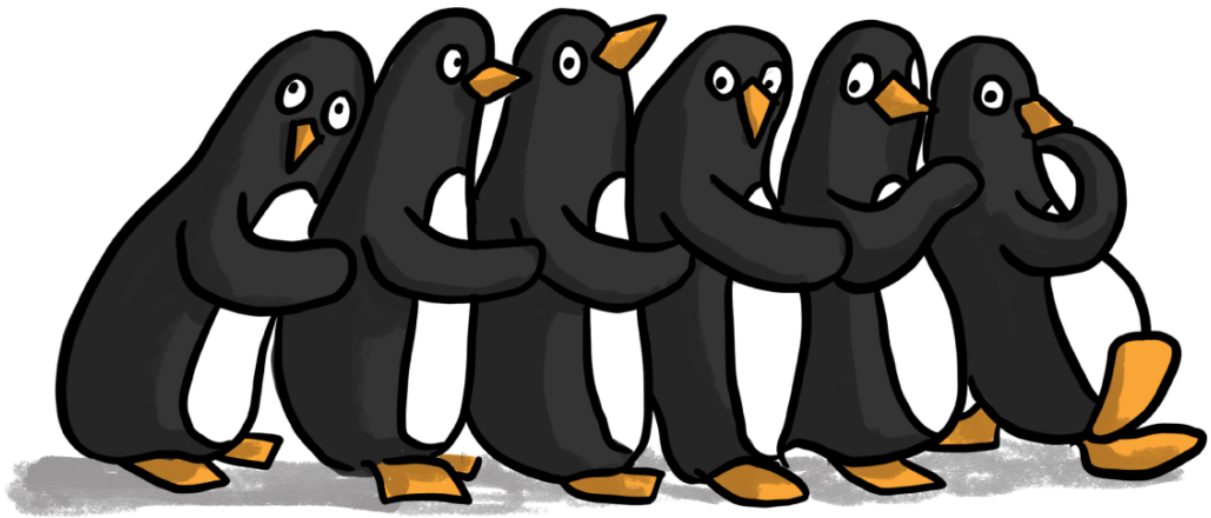
Consequently, the information contained here represents a wide range of contributors and collaborators. The original and intended audience for this volume is the doctoral student working on an open education research project - in short, the typical student member of GO-GN and the profile the network exists to support.

However, we've learned through feedback and analytics that the potential audience for works like this is much larger. Many people who wouldn't describe themselves as researchers still do research and evaluation. Presenting accessible insights into research foundations and practices helps with this and can be understood as a form of open practice.

The [visual style of our publications](#) has been an important part of their accessibility, and I'd like to acknowledge the essential contributions of [Bryan Mathers](#) of [Visual Thinkery](#) here. I'd also like to give a shout out to fellow members of the GO-GN coordination team: Martin Weller, Beck Pitt, Francisco Iniesto, Carina Bossu and Kylie Matthews of [The Institute of Educational Technology](#). You can find the full list of contributors on the following page. Many thanks to all whose work is represented here!



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<https://openedgroup.org/wp-content/uploads/2016/08/OER-Research-Guidebook.pdf>

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## LOG

v1.1 corrects formatting issues and typos from v1.0; corrects pagination; updated references



## How to use this Handbook

This book has four sections. Each section has a short introduction of its own. They are presented in a recommended order but you could also use text search to jump straight to areas of interest.

1. Research Methods Handbook (pp.14-76)

This section covers the research process and the role of method and methodology in research. It starts from broad philosophical discussion about the nature of knowledge and moves towards specific paradigms and research techniques. Included is a section where we share personal experiences of using different approaches in the context of open education research.

2. Conceptual Frameworks Guide (pp.77-163)

This section presents alternative perspectives on the role of conceptual frameworks in research. The distinctive perspectives on this from the literature are presented, and different theoretical approaches related to specific frameworks and methods. Again, we then describe and critically assess how various frameworks have been used in personal research projects. A wide range of alternative theoretical perspectives are outlined.

3. Research Reviews (pp.164-254)

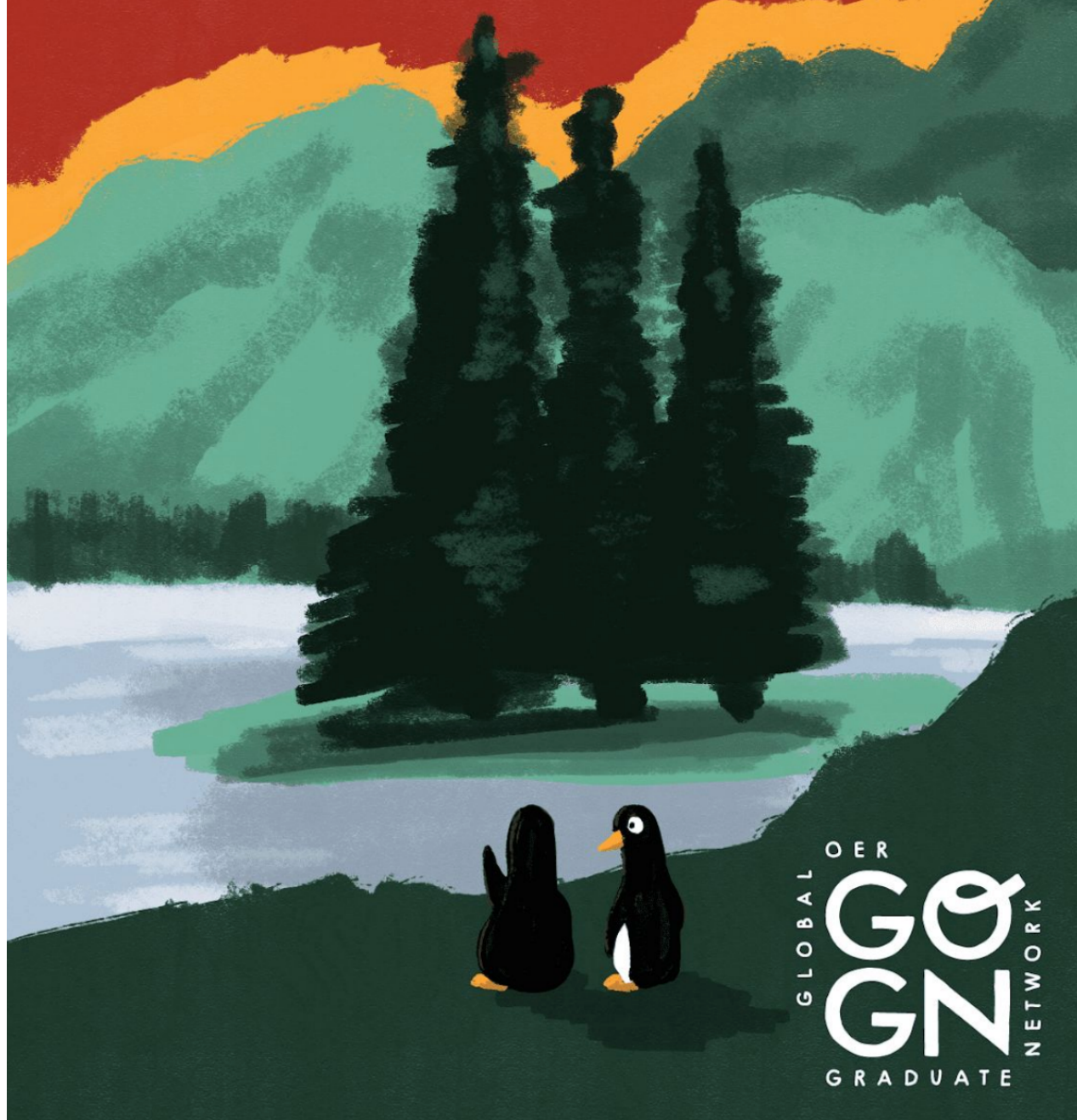
Collated here are reviews of recent research literature. The reviews focus on the relevance of the papers for educational technologists, instructional designers, and educators working in higher education institutions with a particular focus on research into open education. The selection of the papers was determined by the interests of our members and the relevance of particular areas to their own research. In that sense, they represent snapshots or moments in time where researchers engaged with the work of others constructively and critically (as opposed to a systematic review).

4. Additional Resources (pp.255-324)

Openly licensed resources suitable for researchers of open education are reproduced (or linked to) here.

# RESEARCH METHODS

## HANDBOOK



# Research Methods Handbook

## Introduction to Research Methods

Methodology can be one of the most challenging aspects for doctoral researchers. When we conduct research into education and/or technology, we can be confronted with a potentially confusing array of options. This is true even for those using a well-established approach, but can be especially acute if combining approaches in a mixed-methods study or trying to develop a completely new way of doing research.

It can also be hard to raise concerns about methods with supervisors and/or peers. There can be a strong sense that, by the time you are a doctoral scholar, this is something you should have mastered. After all, haven't you been learning about your chosen field for a long time by now? Not feeling confident about research methods can be a route to the dreaded 'imposter syndrome'.

Arguably, methodology is an instance where we should never feel too comfortable, because we would no longer be critically engaging with those aspects of research that convey and ensure the validity and trustworthiness of the conclusions we draw. Depending on our research interests we might want to explore phenomena "horizontally" across a large quantitative dataset, or "vertically" by generating qualitative descriptions of particular cases. Choosing the right method for what we are interested in is a key part of high quality research, and this requires us to think about the scientific and philosophical foundations of what we do.

In this guide we explore some of these issues with a focus on open research, drawing on insights from researchers within the Global OER Graduate Network (GO-GN). Open practices in research can challenge assumptions about how to create and share new knowledge. In this handbook, we draw on insights from experienced open researchers to build understanding of research in the open. The advice given applies to all research, but is of particular relevance to those interested in open approaches.

## Conceptualising Research Methods

What is a 'research method'? The simple answer is to say that it is how someone did a particular piece of research, investigated a topic or attempted to answer a question. This could describe a specific part of the process or it can relate to the process as a whole. Research methods can vary greatly but they all attempt to gather information in order to provide answers that are systematic and reliable.



Research methods are important because they provide the underlying validity for what we do. This is why it is important to critically engage with methodology.

Most of the time, when people talk about 'research methods' they refer to aspects like:

- An approach or technique for conducting research
- How a study is completed
- How data was collected and analysed
- How findings were reported

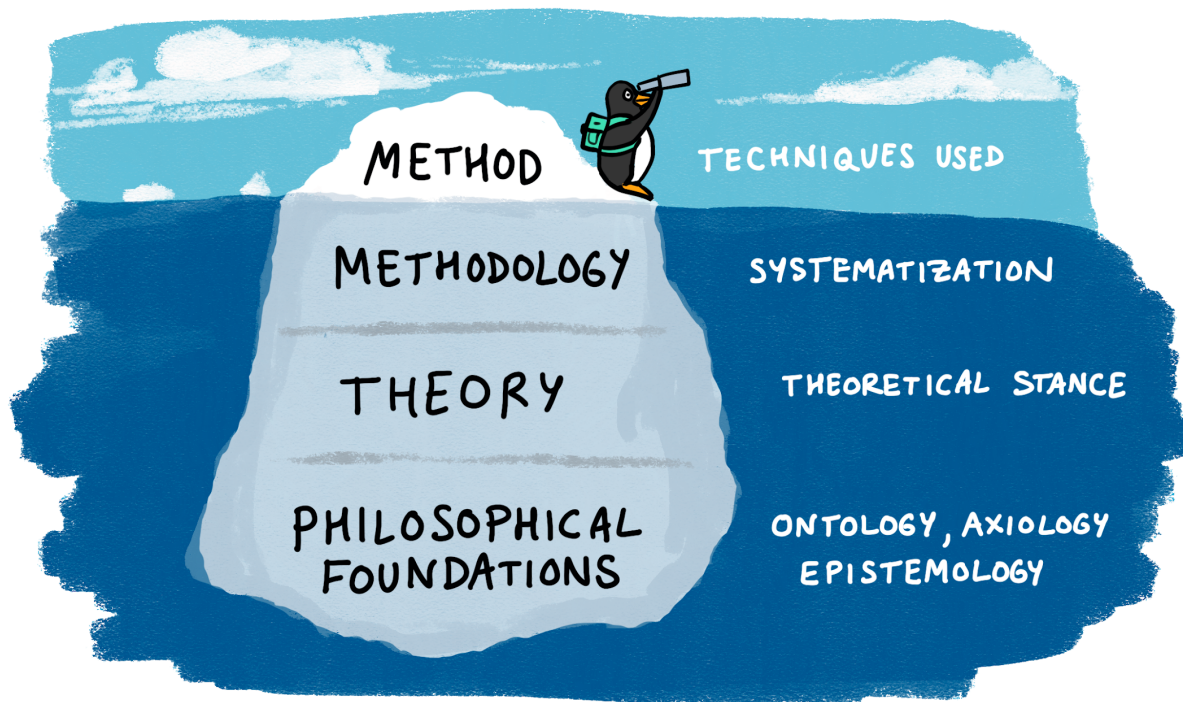
Choosing a method is just the tip of the iceberg when it comes to the deeper justification for ways of doing research. At a more abstract level, these elements are supporting the wider claims made by a piece of research. This includes elements like:

- Testing a hypothesis
- Supporting a claim to new knowledge
- Being reproducible by others

To understand this at a more reflective level, you have to think about methodology. It is important to ground your methodology on a firm basis, and this section will help you understand how your methodology relates to broader beliefs about knowledge. However, it does require a dive into philosophy so if you are just interested in looking at specific methods you may want to skip to a later section.

Methodology is the systematisation, analysis and comparison of different methods. Methods can be closely associated with particular worldviews or ideologies. There are necessarily philosophical and theoretical aspects to this, and this can be intimidating at times, but it's important to critically engage with these questions to improve the quality of research.





*Conceptualising Research Method, Methodology, Theory and Philosophical Foundations*

There are three elements to the philosophical foundation of a research method: Ontology, Epistemology and Axiology (Crotty, 1998; Guba & Lincoln, 1994; Heron & Reason, 1997).

Here are some simple explanations for what these terms mean.

## Ontology

Ontology refers to the study of being (literally, it means “rational discourse about being”). In philosophy, basic questions about existence are typically posed as ontological, e.g.:

- What is there?
- What types of things are there?
- How can we describe existence?
- What kind of categories can things go into?
- Are the categories of existence hierarchical?



This approach to ontology can be considered fundamental in that it underlies our experiences of the world and our beliefs about it. Ontology in philosophy refers to existential matters and questions about the nature of existence. Domain ontology describes concepts and articles relevant to a particular discipline (e.g. a branch of science). Particular domain ontologies can be thought of as arising from philosophical approaches to Ontology but then becoming distinct areas in



themselves (Smith, 2009). This explains how scientific approaches often suspend discussion of more basic ontological questions but they are still underpinned by them. Similarly, Interface ontology describes concepts and articles relevant to several disciplines, and might be used in interdisciplinary or multidisciplinary research.

So, what's the point of ontology in educational research? In applied science, ontologies are used to describe the different entities and domains within a particular system or investigation. Simply put, before we can study a phenomenon we need to define it. Within a particular study we focus on the specific thing(s) under investigation and how we define the parameters of a study. While most researchers won't need to engage at length in philosophising about ontology, it's an important consideration when choosing an approach because it partly determines what constitutes validity in a particular study.

Ontology is considered part of what philosophers call Metaphysics. Metaphysics is about the fundamental nature of reality. Metaphysics is a long-contested term – difficult to define – which many have suggested is meaningless in the face of modern (quantitative) science. The traditional domains of metaphysics include theories explaining relationships, states of being; causation; phenomena; categories of being (e.g. spatio-temporality; minds; identity; necessity & possibility; freedom; essence).

While scientists don't really see themselves as doing metaphysics, there is almost always some metaphysics involved in science, even if it is very abstract. If you want to go deeper into this, there's a useful summary on the Internet Encyclopedia of Philosophy at <https://www.iep.utm.edu/met-scie/>.

## Epistemology

Epistemology is derived from the Ancient Greek *epistēmē* which refers to systematic or reliable knowledge (as opposed to *doxa*, or "belief"). The research concept here is "rational discourse about knowledge" and the focus is the study of knowledge and methods used to generate knowledge.



Epistemology has a history as long as Philosophy, and in many ways is the foundation of both scientific and philosophical knowledge.

Epistemological questions include:

- What is knowledge?
- How can we claim to know anything at all?
- What does it mean to know something?
- What makes a belief justified?
- What is the relationship between the knower and what can be known?

While the philosophical dimensions can be abstract and generalized, thinking about these kinds of questions in the context of research makes them more targeted because it enables you to align specific methods against specific questions more appropriately. Epistemology is closely connected to method as they are both concerned with knowledge creation and validation (broadly construed). Research methods are essentially epistemologies – by following a certain process we support our claim to know about the thing(s) we have been researching. Inappropriate or poorly followed methods can undermine claims to have produced new knowledge or discovered a new truth. This can have implications for future studies that build on the data and/or conceptual framework used.

Research methods can be thought of as essentially stripped down, purpose-specific epistemologies. Research attempts to add to knowledge. However, it's important to note that methods and epistemologies are accompanied by ontological (and often axiomatic) commitments. One key consideration here is the status of 'truth' within a particular epistemology or research method. If, for instance, some approaches emphasize subjective knowledge and deny the possibility of an objective truth, what does this mean for choosing a research method? We'll discuss this in more detail in the section on Research Paradigms.

## Axiology

Axiology is the study of values and value judgements (literally "rational discourse about values [*axía*]"). In philosophy this field is subdivided into ethics (the study of morality) and aesthetics (the study of beauty, taste and judgement). For the hard-nosed scientist the relevance of axiology might not be obvious. After all, what difference do one's feelings make for the data collected? Don't we spend a long time trying to teach researchers to be objective?



Like ontology and epistemology, the import of axiology is typically built into research paradigms and exists “below the surface”. You might not consciously engage with values in a research project, but they are still there. Similarly, you might not hear many researchers refer to their axiomatic commitments but they might well talk about their values and ethics, their positionality, or a commitment to social justice.

Our values focus and motivate our research. These values could include a commitment to scientific rigour, or to always act ethically as a researcher. At a more general level we might ask: What matters? Why do research at all? How does it contribute to human wellbeing?

Almost all research projects are grounded in trying to answer a question that matters or has consequences. Some research projects are even explicit in their intention to improve things rather than observe them; this is most closely associated with “critical” approaches.

## Research Paradigms

A lot of effort can be spent refining and calibrating a research question to fully understand what kind of data could be collected and what kind of validity analysis might offer when answering the question. Researchers rarely proceed by choosing an ontology, epistemology and axiology separately and then deciding which research method to apply. Instead, the starting point will usually be a research question framed within a particular paradigm. It's also common in practice for researchers to identify the method they will use (perhaps determined by the data that is available) and then articulate the theoretical justification behind it by drawing on a paradigm.

Kuhn's (1962) *The Structure of Scientific Revolutions* is one of the most influential works on the philosophy of science, and is credited with introducing the idea of competing paradigms (or "disciplinary matrices") in research. Kuhn investigated the way that scientific practices evolve over time, arguing that we don't have a simple progression from "less knowledge" to "more knowledge" because the way that we approach inquiry is changing over time. This can happen gradually, but results in moments of change where our understanding of a phenomenon changes more radically (such as in the transition from Newtonian to Einsteinian physics; or from Lamarckian to Darwinian theories of evolution).

There are four stages in the cycle of science in Kuhn's approach. Firstly, a pre-paradigmatic state where competing approaches share no consensus. Secondly, the "normal" state where there is wide acceptance of a particular set of methods and assumptions. Thirdly, a state of crisis where anomalies that cannot be solved within the existing paradigm emerge and competing theories to address them follow. Fourthly, a revolutionary phase where some new paradigmatic approach becomes dominant and supplants the old. Schnieder (2009) suggests that the Kuhnian phases are characterised by different kinds of scientific activity.

Newer approaches often build upon rather than replace older ones, but they also overlap and can exist within a state of competition. Scientists working within a particular paradigm often share methods, assumptions and values. In addition to supporting specific methods, research paradigms also influence things like the ambition and nature of research, the researcher-participant relationship and how the role of the researcher is understood.

For studies that look into paradigmatic change within open education research, see Bozkurt (2019) and Weller et al. (2018). Next we will go on to look at methods associated with different research paradigms.

## Paradigmatic Methods

There are several dominant paradigms in education research and four (Positivism, Interpretivism, Critical and Pragmatic) are outlined here. Positivism and Interpretivism are distinguished by their different approaches to data collection and underlying ontological and epistemological commitments. The difference between Positivism and Interpretivism is a good place to start, since Critical and Pragmatic approaches build on these.



### Positivism / Post-positivism

Positivism has its roots in the scientific revolution of the Enlightenment. Positivism is based on the idea that we can come to know facts about the natural world through our experiences of it. The processes that support this are the logical and analytic classification and systemisation of these experiences. Through this process of empirical analysis, Positivists aim to arrive at descriptions of law-like relationships and mechanisms that govern the world we experience.

Positivists have traditionally claimed that the only authentic knowledge we have of the world is empirical and scientific. This was partly a response to the historical primacy of metaphysics as a way to explain the world. Essentially, Positivism downplays any gap between our experiences of the world and the way the world really is and takes it that we determine objective “facts” through the correct methodological combination of observation and analysis. Data collection methods typically include quantitative measurement, which is supposed to overcome the individual biases of the researcher.

Positivism aspires to high standards of validity and reliability supported by evidence, and has been applied extensively in both physical and social sciences. The advantage of such approaches lies in an iteratively expanding evidence base, and a deep epistemological separation between “the knower” and “what is known” which supports the idea that what has been discovered is “true” and not just the opinion of a researcher. However, the criticism often made of Positivism with regard to human and social sciences (e.g. education, psychology, sociology) is that Positivism is scientistic; which is to say that in pursuit of “hard” science it fails to recognise that many aspects of human experience don’t conform to this way of collecting data. Similarly, it’s hard to guarantee that research design is ever completely free from human bias.



Kivunja & Kuyini (2017) describe the essential features of Positivism as:

- A belief that theory is universal and law-like generalisations can be made across contexts
- The assumption that context is not important
- The belief that truth or knowledge is 'out there to be discovered' by research
- The belief that cause and effect are distinguishable and analytically separable
- The belief that results of inquiry can be quantified
- The belief that theory can be used to predict and to control outcomes
- The belief that research should follow the Scientific Method of investigation
- Rests on formulation and testing of hypotheses
- Employs empirical or analytical approaches
- Pursues an objective search for facts
- Believes in ability to observe knowledge
- The researcher's ultimate aim is to establish a comprehensive universal theory, to account for human and social behaviour
- Application of the scientific method

Many quantitative researchers now identify as Post-Positivist. Post-Positivism retains the idea that truth should be considered objective, but asserts that our experiences of such truths are necessarily imperfect because they are ameliorated by our values and experiences. Post-Positivists are more likely to use mixed methods and triangulation of quantitative and qualitative data, accepting the problematic nature of "objective" truths. A popular form of Post-Positivism is Critical Realism, which lies between Positivism and Interpretivism.

*Positivist Methods:* Document coding; Experimental & Quasi-experimental design; Isolating & measuring variables; Statistical analysis; Structured interviews; Surveys

## Interpretivism

Often contrasted with Positivism is Interpretivism. The starting point for Interpretivism - which is sometimes called Anti-Positivism - is that knowledge in the human and social sciences cannot conform to the model of natural science because there are features of human experience that cannot objectively be "known". This might include emotions; understandings; values; feelings; subjectivities; socio-cultural factors; historical influence; and other meaningful aspects of human being. Instead of finding "truth" the Interpretivist aims to generate understanding and often adopts a relativist position.

Qualitative methods are preferred as ways to investigate these phenomena. Data collected might be unstructured (or "messy") and correspondingly a range of techniques for approaching data collection have been developed. Interpretivism acknowledges that it is impossible to remove cultural and individual influence from

research, often instead making a virtue of the positionality of the researcher and the socio-cultural context of a study.

One key consideration here is the purported validity of qualitative research. Interpretivism tends to emphasize the subjective over the objective. If the starting point for an investigation is that we can't fully and objectively know the world, how can we do research into this without everything being a matter of opinion? Essentially Positivism and Interpretivism retain different ontologies and epistemologies with contrasting notions of rigour and validity (in the broadest rather than statistical sense). Interpretivist research often embraces a relativist epistemology, bringing together different perspectives in search of an overall understanding or narrative.

Kivunja & Kuyini (2017) describe the essential features of Interpretivism as:

- The admission that the social world cannot be understood from the standpoint of an individual
- The belief that realities are multiple and socially constructed
- The acceptance that there is inevitable interaction between the researcher and his or her research participants
- The acceptance that context is vital for knowledge and knowing.
- The belief that knowledge is created by the findings, can be value laden and the values need to be made explicit
- The need to understand the individual rather than universal laws
- The belief that causes and effects are mutually interdependent
- The belief that contextual factors need to be taken into consideration in any systematic pursuit of understanding

Interpretivism as a research paradigm is often accompanied by Constructivism as an ontological and epistemological grounding. Many learning theories emphasize Constructivism as an organising principle, and Constructivism often underlies aspects of educational research.

*Interpretivist Methods:* Case Studies; Conversational analysis; Delphi; Description; Document analysis; Interviews; Focus Groups; Grounded theory; Phenomenography; Phenomenology; Thematic analysis

The table below provides a comparison of the characteristic philosophical and methodological aspects of Positivism and Interpretivism.

	Positivism	Interpretivism
<b>Ontology</b>		
Being in the world	Direct access (Naturalism)	Indirect access (Idealism)
Reality	Objective, accessible	Subjectively experienced
<b>Epistemology</b>		
Relation between knowledge and reality	Objective knowledge of the world is possible supported by appropriate method	Objective knowledge of the world is possible supported by appropriate method
Epistemological goals	Generalisation, abstraction, discovery of law-like relationships	Knowledge of specific, concrete cases and examples
Basic approach	Hypothesis formation and testing	Describing and seeking to understand phenomena in context
<b>Methodology</b>		
Focus	Description and explanation	Understanding and interpretation
Research Perspective	Detached, objective	Embedded in the phenomena under investigation
Role of emotions	Strict separation between the cognitions and feeling of the researchers	Emotional response can be part of coming to understanding
Limits of researcher influence	Discovery of external, objective reality - minimal influence	Object of study is potentially influenced by the activity of the researcher
Valued approaches	Consistency, clarity, reproducibility, rationality, lack of bias	Insight, appreciation of context and prior understanding
Fact/value distinction	Clear distinction between facts and values	Distinction is less rigid, acknowledges entanglement
Archetypal research methods	Quantitative (e.g. statistical analysis)	Qualitative (e.g. case study)

*Ontology, Epistemology and Methodology across Positivism and Interpretivism  
(adapted from Carson et al., 2001)*

## Critical / Transformational

This paradigm is most closely associated with the intellectual history that includes Critical Theory, Marxism, Feminism, Critical Pedagogy, and Critical Realism. Within critical approaches, axiology, positionality and values are foregrounded. In contrast with the detached, "objective" observations associated with the positivist researcher, critical approaches make explicit the intention for research to act as a transformative or emancipatory force at a social level. This might involve the way a research project is framed (for instance, as motivated by an interest in social justice) or the kind of data that is collected (e.g. metrics on age, gender, sexuality, or race that can be used to illuminate inequality). Methods used by critical researchers are often interdisciplinary, combining Positivist and Interpretivist techniques to describe contextual and historical factors. In addition, there are some methods which belong distinctively to the critical paradigm (see below).

*Critical Methods:* Action research; Critical ethnology; Deconstruction; Dialectics; Field research; Textual analysis

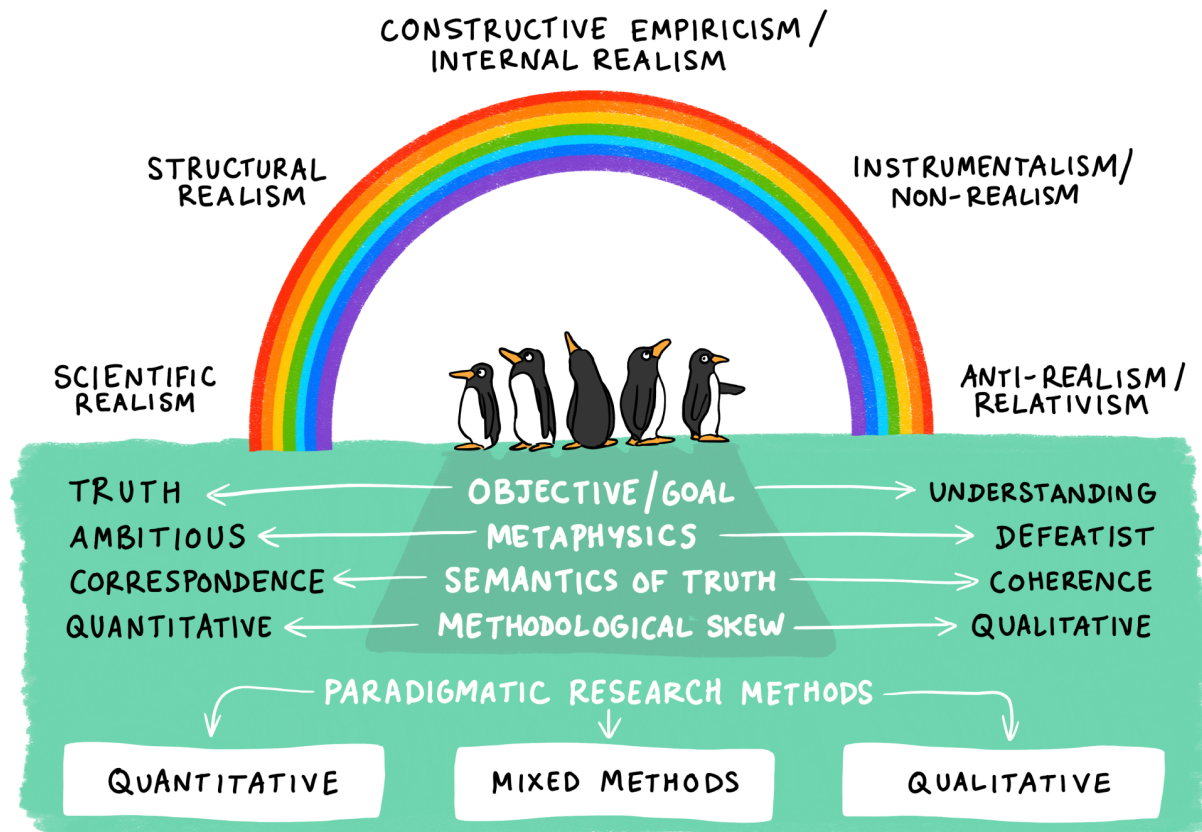
## Pragmatism

"Essentially, all models are wrong but some are useful." (Box, 1976)

Pragmatism suspends questions of the final 'truth' of research outcomes and focuses only on their usefulness for a particular end. Pragmatists often make use of mixed methods and typically vary their approach depending on the constraints of a particular project. This can be quite effective for smaller or time-pressured research projects and avoids getting bogged down in philosophical issues and academic debates, but perhaps is of limited use in a doctoral project where the goal is usually to take the time needed to create new knowledge. On the other hand, doctoral projects are time-bound and moving in the direction of Pragmatism can be a route to successfully completing a project.

The crucial consideration for the Pragmatist is whether the outcomes of research have any application value rather than whether they are "true". There are no distinctively pragmatic research methods since this approach is about making judicious use of the others. Pragmatic approaches may be less likely to prioritise ontological, epistemological or axiological consistency when combining different research methods, but the emphasis is on solving a pressing problem and adapting to the limitations of a project.

Each of these paradigmatic approaches is associated with methods that reflect their philosophical commitments, but the most important methodological difference is perhaps between Positivist and Interpretivist worldviews. Other paradigms typically make use of these approaches but with a distinctive slant. The following diagram shows how research approaches map onto philosophical worldviews.



Causal Comparative (Explain variation, regression based)  
Correlation Based (Relation between variables)  
Data Mining & Analytics  
Experimental & Non-experimental  
Longitudinal Analysis  
Meta-Analysis  
Random Controlled Trials  
Quasi-experimental  
Survey

Convergent Parallel  
Embedded Design  
Explanatory Sequential  
Exploratory Sequential  
Interdisciplinary  
Multidisciplinary  
Multiphase  
Transformative  
Mixed Methods  
Survey

Action Research  
Case Study  
Cognitive Interviews  
Content Analysis  
Design-Based Research  
Ethnography  
Grounded Theory  
Historical  
Iterative Design  
Meta-synthesis  
Narrative  
Phenomenology  
Survey

Moving from a research paradigm to a specific research design can be a challenging process. In practice, research projects will often involve striking a balance between different elements of data collection and synthesis. It's also important to ensure that the approach taken reflects the research question.

See Ryan (2018) and Pham (2018) for more on the advantages and disadvantages of different paradigms.

## Multidisciplinarity, Interdisciplinarity, Transdisciplinarity

Increasingly, research takes place across traditional disciplinary boundaries. This can be a collaboration between people from different subject backgrounds, or one researcher might combine approaches based on the research question(s) they are attempting to answer.

This kind of research presents its own challenges, especially for the solo researcher. Disciplines define themselves by their epistemological foundations, so it's easier to combine approaches with similar epistemologies. The further apart the assumptions of the disciplines, the harder it would seem to be to combine them. But there are options here.

As Choi & Pak (2006) note, the terms multi-, inter- and trans- disciplinarity are often used interchangeably, partly because they are often ambiguously defined. They propose the following schema:

- Multidisciplinary research draws on several disciplines in parallel but they remain separate from each other
- Interdisciplinary research synthesizes approaches from different disciplines into a new and coherent whole
- Transdisciplinary research integrates and transcends disciplinary boundaries, bridging humanities and sciences

Obviously the specific combination of approaches used will require some thinking about research design. So why bother? The appeal of these combinations is that they allow for new and innovative ways of approaching research questions, so much so that entirely new subject areas are created. This can often result from the application of digital technology (as in the case of digital humanities) but more often is used to address a 'grand challenge' from several vectors at the same time. Using a well-established research method can minimise the methodological complication of a project, but you might want to use several methods to approach a research question from several angles at once, particularly if you are seeking a unique angle for doctoral research



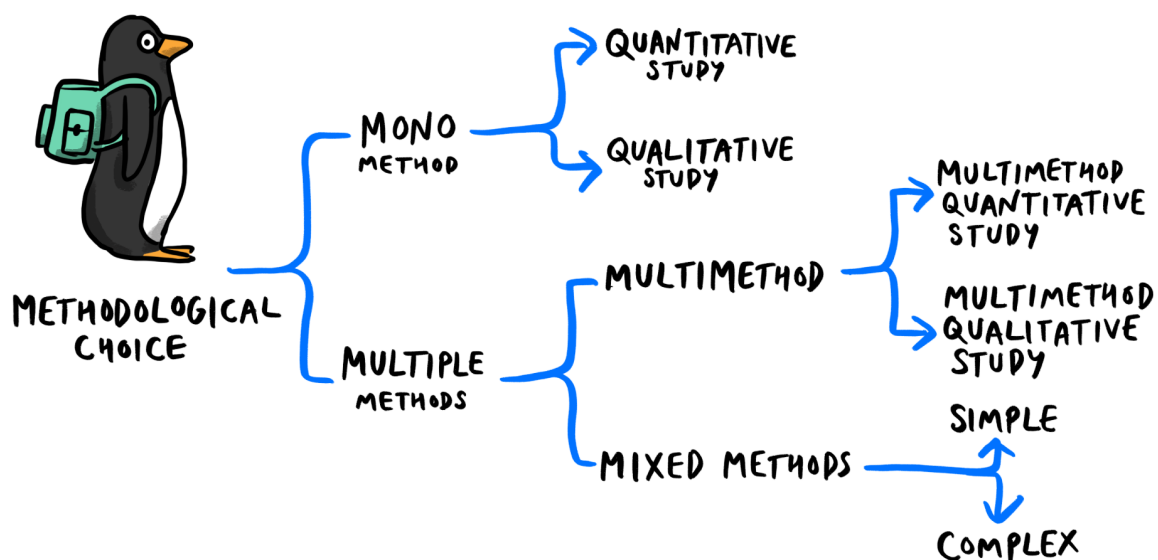
von Wehrden et al. (2019) identify five basic units that can help to guide interdisciplinary and transdisciplinary research.

1. Creation of collective glossaries
2. Definition of boundary objects
3. Use of combined problem- and solution-oriented approaches
4. Inclusion of a facilitator of inter-and transdisciplinary research within the research team
5. Promotion of reflexivity by accompanying research

## Mixed Methods & Triangulation

Combining research methods is characteristic of the approaches taken by multidisciplinary, interdisciplinary and transdisciplinary researchers. But it is also commonly found in disciplinary research. "Mixed methods" is used to describe research that combines qualitative and quantitative data in a single study. This is often done to recognise and try to overcome the limitations of different approaches, but when it comes to assembling the data into a whole (known as "triangling") great care must be taken to ensure that the resulting claims made are supported. (See also the description of Mixed Method Research on p.50 below.)

See Creswell (2009; 2013) for a popular and accessible description of how to approach mixed method research design.



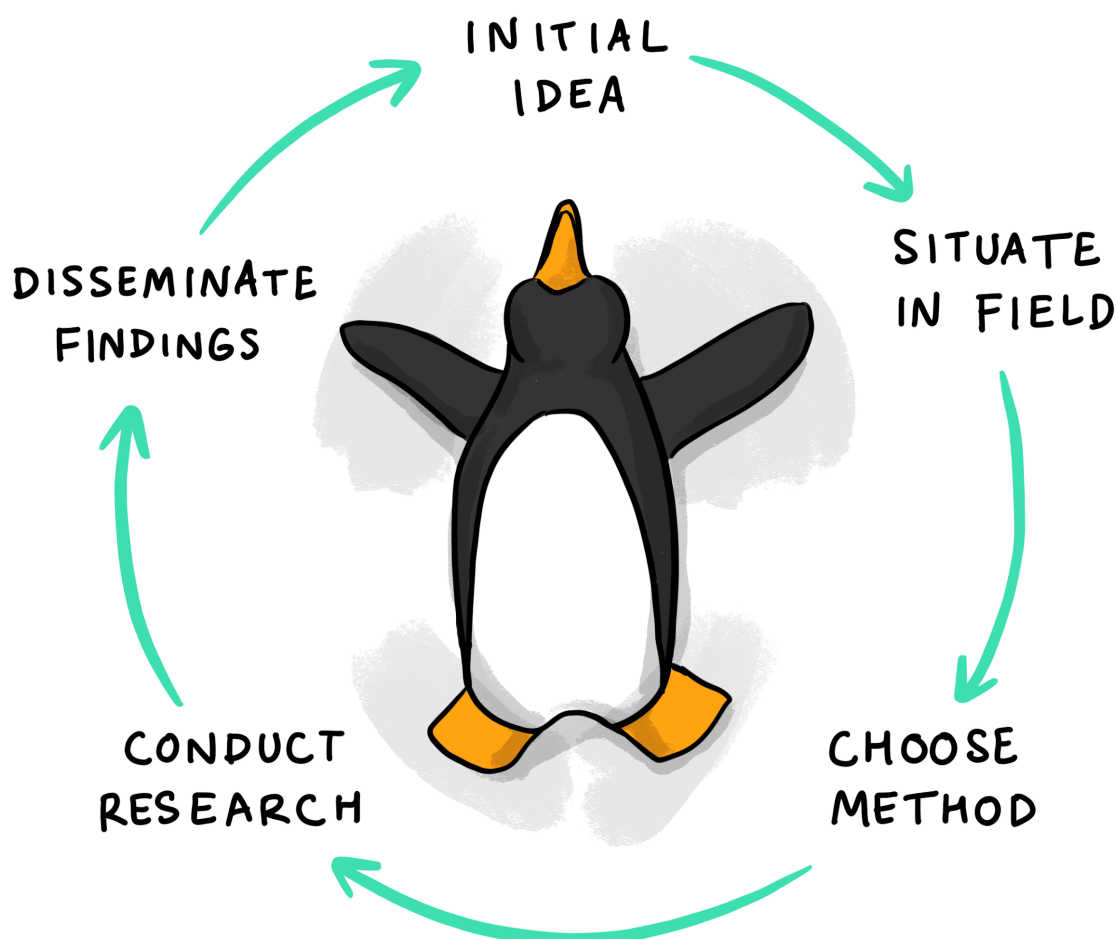
*Mono and Multiple Method Research Design (based on Saunders et al., 2009:152)*

## Researching Open

So far we have discussed the foundations of research and different methodological approaches in a quite general sense. If you're interested in researching aspects of open education – such as open educational resources (OER) or open educational practices (OEP) – are there certain methods that are preferable? It's possible to get a sense of this from looking briefly at the history of research in open education and understanding what has been impactful.

## Open Research Cycles

If we view a typical research lifecycle as follows:



*The Research Lifecycle*

For each of these stages, open practice can be seen to offer alternatives or opportunities to enhance the phase. Taking each in turn we can examine some examples.

## Devise idea

Use of blogs, social media etc can be useful to test out ideas and get early feedback. Also can conduct lightweight pilot studies, surveys and find possible collaborations. We developed an Open research agenda through this method.

## Situate in field

Open access has been one of the great successes of open research, it means researchers can have access to literature you might not otherwise. Use of open data can also be useful to test viability. A search through openly available research bids can be productive.

## Choose appropriate method

New methods based on open approaches are available such as crowdsourcing, data visualisation, or network analysis. There may be different ways to approach the problem than the traditional ones. For example, Weller et al. (2018) used citation analysis to produce an Open Education Guide. Creswell (2014) provides simple criteria for selecting a research approach, based on problems and questions, research experiences, and audience.

## Conduct research

The concept of "guerrilla research" (Weller, 2013) begins from the idea that there is lots of free, open material which means it is possible to conduct "lightweight" research without permission. This is often smaller scale work that can be undertaken by an individual, it effectively condenses the whole research cycle: researcher has the idea, finds open data, undertakes some analysis, then blogs it: all without the need for funding or permission. When doing this kind of research it's important to maintain standards in research ethics.

An open approach which communicates through social media throughout the process can raise profile and lead to collaboration. Katy Jordan's work with MOOC completion rates was done using open data, which she blogged and visualised using open tools. This was picked up in the USA and led to an invite from Gates Foundation to bid for further work (Jordan, 2017).

## Disseminate

Disseminating work via open access brings greater visibility, citations and downloads “open access citation advantage”. But beyond this there are other approaches to dissemination, including blogs, social media and video to get across messages. Development of other outputs beyond the traditional papers, such as infographics, MOOCs, and open tools. The Open Education Research Hub developed an Open Researcher Pack and Open Researcher Handbook as an output to be used by open researchers to increase capacity.

- Farrow, R., Perryman, L.-A., de los Arcos, B., Weller, M. & Pitt, R. (2016). OER Hub Researcher Pack – a toolkit for open education researchers. Open Education Research Hub. <https://oerhub.pressbooks.com/>
- Pitt, R. de los Arcos, B. Farrow, R. and Weller, M. (2016). Open Research. Open Education Research Hub. <http://oro.open.ac.uk/48035>

Arguably open education research has reached a phase of maturity. In recent years we have seen examples which support the idea that open education research is being recognized as a field in itself.

## Open Practices

Open practice is also an emerging field. One characteristic feature of open researchers is that they often integrate open elements into what they do. This can include things like:

- Agile project management
- Directly influencing practice
- Radical transparency
- Social media presence, blogging
- Using networks as a research resource
- Sharing research instruments
- Open access publication



It's for individual researchers to decide the extent to which they make their practice open, but many find that open practices improve the efficiency, reach and impact of their work.

Weller (2011) proposed a schema for an open, networked research cycle as follows:

## Planning

The researcher establishes their research question through iterative exposure, using social networks, and blogs. They seek feedback and ask for relevant experience. Using online information sources such as delicious feeds and Google scholar they gather relevant information to inform their research proposal. They set up a series of Google alerts around a number of subjects to gather daily information. A plan is created that incorporates regular release and small scale outputs. They hold an informal online meeting with some interested parties and establish a project blog or wiki.

## Collecting data

The researcher continues to use online information sources for their literature review. They create an online database and seek user contributions, seeded by requested contributions from peers in their network. An online survey is created in SurveyMonkey.

## Analysing

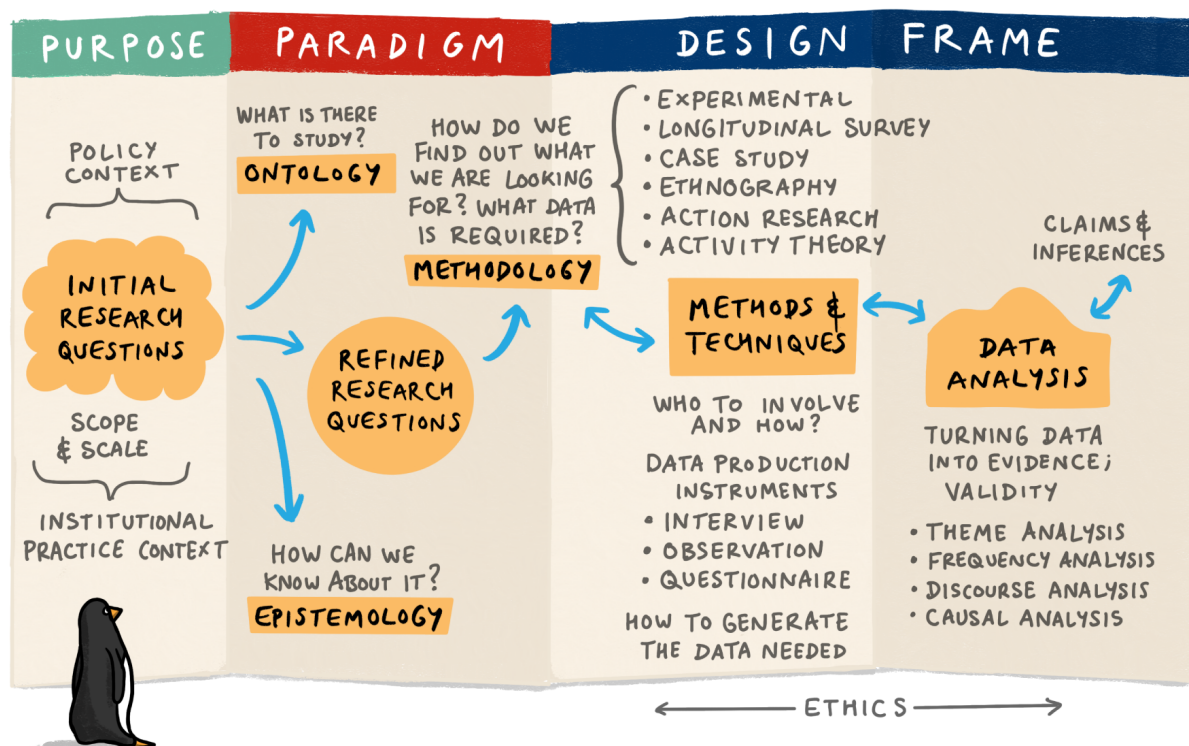
The researcher uses Google analytics to examine traffic data, and SurveyMonkey analytics to analyse responses. They use data visualisation tools such as ManyEyes to draw out key themes in responses.

## Reflecting

Reflection occurs throughout the process by means of a series of blog posts and video interviews.

## Designing a Research Project

In this part we describe the process of moving from a research question to selecting a research paradigm and generating a process for conducting a research project.



*The Research Design Process*

## Planning Research

This diagram (taken from an archived Open University (UK) course entitled [E891 Educational Inquiry](#)) shows one way to schematise the research design process. Here, one begins with a research question and a context for the research (comprising policy and practice). This informs the potential scope and scale of the project. The next element is to consider the paradigmatic research approach that will be used, thinking about the ontological and epistemological elements. The approach taken will often reflect the nature of the research question; the kind of data it is possible to collect; and work previously done in the area under consideration. This is the design phase where most researchers will consult relevant literature and contributions by others.

Once working from a research paradigm it becomes possible to start making concrete choices about method(s). Depending on the project, this will involve choices about things like:

- Who will be involved? How will they be selected/contacted?
- How data will be collected
- How data will be managed and stored securely
- Designing, producing and piloting research instruments
- Determining the basis of rigour in the study and the “trustworthiness” (credibility, transferability, dependability, and confirmability) of the data (Guba, 1981; Shento, 2004)
- Ensuring ethical good practice is built into the project (see below)
- Setting a plan for data analysis

The data collection phase can begin once these decisions are made. It can be very tempting to start collecting data as soon as possible in the research process as this gives a sense of progress. However, it is usually worth getting things exactly right before collecting data as an error found in your approach further down the line can be harder to correct or recalibrate around.

From here, things become a bit less generic as the specifics of data collection and analysis are going to be determined by the research methods being used. There are additional aspects which it is worth considering in detail at the research design stage.

## Ethical Issues

If you are doing research within an institution there will be regulations and guidelines to follow to ensure that your work meets required ethical standards. The standards are usually set by a local body (e.g. an ethics committee or Institutional Review Board) to meet generally accepted guidelines. Conforming to their guidelines is usually an institutional requirement, but it is also good practice. Even if you are doing research without an institutional affiliation it's a good idea to meet these standards. For instance, CITI certification is a USA standard for conducting human subject research: (<https://about.citiprogram.org/en/homepage/>).



Since it can take several months to get formal ethical approval for a project, it's essential to start the process as soon as possible so this does not impact on your data collection schedule. Auditing the ethical aspects of a project can also be a



useful way of refining your research and anticipating issues that could arise downstream.

- See Farrow (2016) for an overview of research ethics in open education
- Consider taking the research ethics training offered by your local institution, or by the National Institutes of Health (USA)  
<https://ethics.od.nih.gov/training.htm>

You can also approach members of the GO-GN team and wider network for advice on dealing with ethical issues or other matters that arise.

## Managing Risk

Risk is part of all kinds of activities. Doing research carries risks characteristic of all projects which require adequate time, money and quality in the final product. Some of these overlap with ethical issues, such as ensuring that people who participate in your research aren't exposed to unnecessary harm and ensuring that consent is informed. These are usually addressed when writing the protocols for a study and included in IRB or ethics committee applications, who will often want to see an ethics plan and copies of the proposed research instruments.

Ethical considerations are foregrounded since minimising the risk to people is the most important mitigation. Aside from these, there are interrelated operational issues to consider throughout the research lifecycle.

- **Costs:** For a lot of doctoral researchers making sure they have adequate funding throughout can be a challenge. This can be a matter of a grant not covering all of the activities required for a project; or can result from overrunning in time. Failure to correctly estimate costs when you start a project can lead to problems downstream. Managing the financial aspects is a key element in successful projects.
- **Time:** It's common for people writing PhDs or EdDs to feel the pressure of time, especially if they have to balance their studies alongside personal and professional commitments. Doctoral study also involves more self-regulation than other degrees. Managing your time and finding ways of being productive when you need to are important skills for researchers.
- **Scope:** Doctoral projects can start with a well defined research question but, as the literature is reviewed, the essence of the project begins to evolve. This is no bad thing as it shows that the ideas and concepts are being developed, but if the definition of the project starts to change then care must be taken to ensure that it can still be delivered with the resources available.

- **Quality:** Quality refers to the standard of the work being delivered, and is to some extent dependent on the other factors. At a practical level, the most important quality consideration is convincing your examiners that you meet your institutional requirements for the award of a doctorate.

At its most general level, risk management is about anticipating problems before they arise and adapting to unforeseen situations. What happens if things don't go as anticipated? You might lose access to a data source that you were relying on. Do you have a plan B? Plan C? What happens if you fall ill and are unable to work on your project? When focused on the academic parts of a project it can be easy to overlook these kinds of considerations.

Ideas for risk mitigation:

- A better research design can mitigate more risk, or build in more contingency.
- Practising agile approaches develops the ability to adapt to changing circumstances while maintaining overall vision.
- Writing a log of risks and their mitigation as a project is underway to record further issues that arise so you can get better at anticipating and solving problems.

## Using Technologies

Many modern research techniques use specific software programs to support the process of analysis. Some of these are listed in the table below along with examples of software commonly used in different parts of the research cycle.

This table is intended to be illustrative, not exhaustive or exemplary. There are many hundreds of software options available to researchers, and different packages can appeal for different reasons (such as licensing, relevant to task, user interface, versatility, etc.)

Purpose	Categories	Examples
Search & Discovery	Search Engines	Duck Duck Go Firefox Google Google Scholar Alerts RSS
	Bibliographic Search	Google Scholar Subject-specific databases
Data Collection		Google Forms SurveyMonkey
Data Analysis	Statistical	Microsoft Excel SPSS Stata R
	Qualitative Data Analysis (CAQDAS)	ATLAS.ti Coding Analysis Toolkit (CAT) Dedoose MAXQDA NVivo qcoder
Data Visualization		Blender Datawrapper QGIS Shiny Tableau
Reference Management		Endnote Mendeley RefWorks Zotero
Manuscript Preparation	Word processor	Google Docs LateX Libre Office Microsoft Word OpenOffice
Dissemination	Academic Social Networks	Academia.edu Google Scholar Mendeley ResearchGate
	Presentations	Google Slides Microsoft PowerPoint Prezi

*Examples of software used in parts of the research lifecycle*

Having to learn how to use new software can be intimidating, and time may need to be set aside for this. Sometimes it's worth undertaking some formal training in the use of software (particularly for data analysis). Effective technology enhanced workflows can make research more efficient as well as enhancing the agency and reach of the researcher.

## Self Management

Doctoral study is unlike other degrees in terms of expecting candidates to display a very high level of self-organisation and self-management. It can take a while to settle into different ways of working, especially if things don't go according to plan right away. When planning research, don't expect superhuman things of yourself and ensure that you practice self-care by factoring in time for breaks and contingencies. It's a good idea not to underestimate the time it will take to do things to a high level of quality.



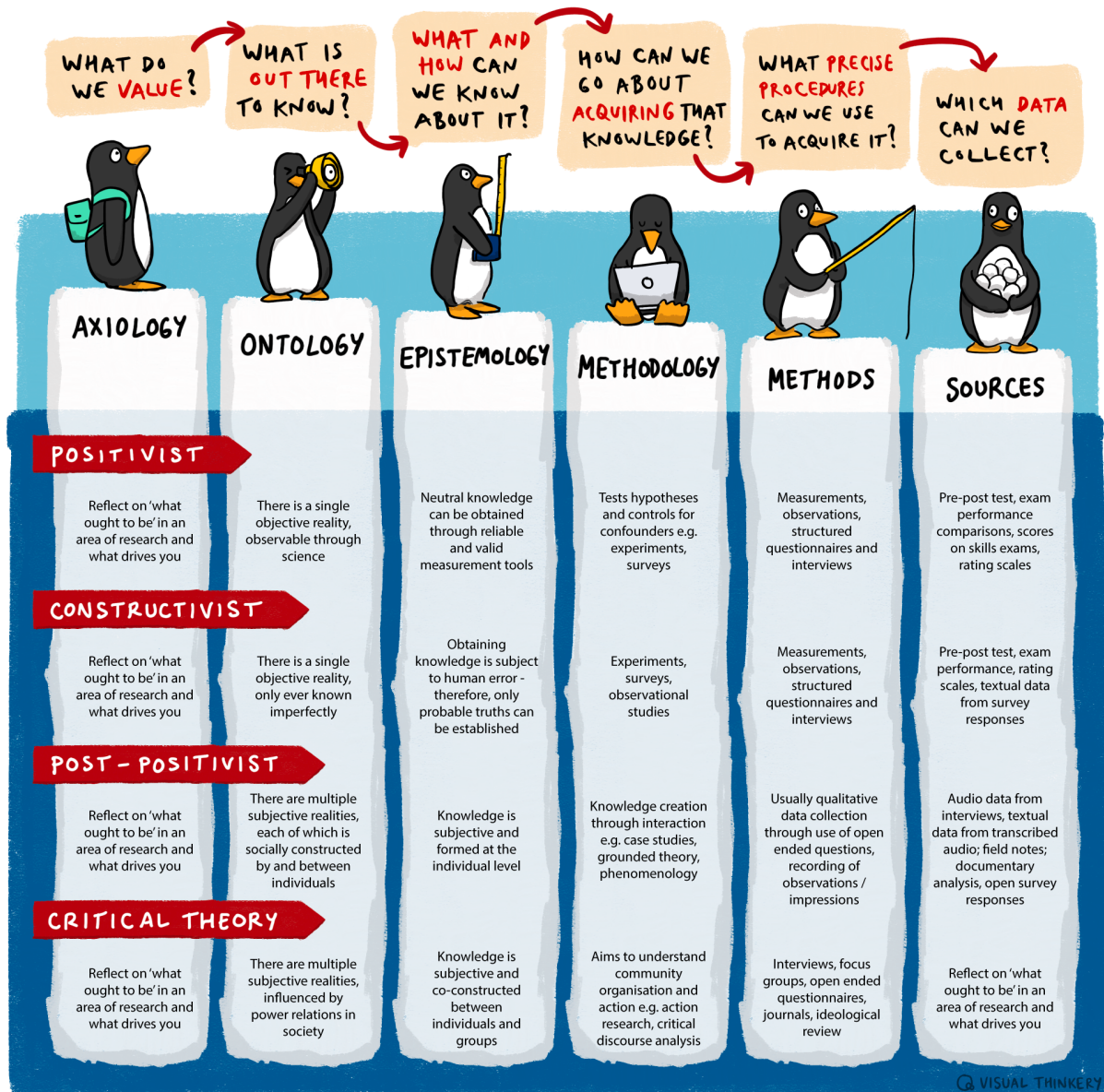
Getting the most out of yourself and staying on top of your project is a challenge in its own right. It can be helpful to regularly take stock of what has been achieved so far, reflecting on what could work better.

It's also important to plan for your own professional development throughout the life of your doctoral studies. Will you need to learn new skills (or brush up old ones)? Institutions often have a budget to support this but places on training programmes can be limited.

Another thing to think about is developing your personal networks, particularly if your research is dependent on them. Networks like GO-GN can be a valuable source of support throughout a Ph.D or Ed.D.

## Research Design

By this point we hope you have a sense of how research methods can take us on a journey, working from ideas and philosophical speculation to a specific set of actions that can generate new knowledge. All of these elements need to inform the design of research. It's often helpful to keep in mind the ultimate goal of your project so you can design your specific activity around reaching this point.

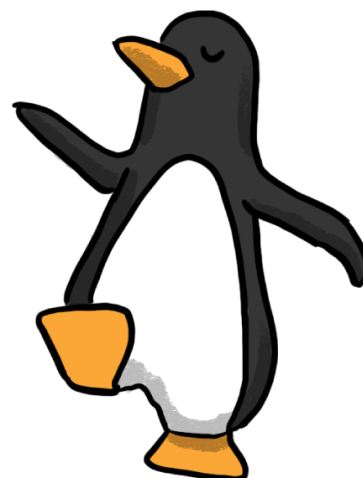


*Progression through the Research Process (based on Brown & Dueñas, 2020)*

For more on the research design process, see the following: Ajzen (1991); Akkerman & Bakker (2011); Anderson (2013); Armellini & Nie (2013); Bloor & Wood (2006); Brown & Wyatt (2010); Casadeval & Fang (2016); Clements & Pawlowski (2012); Conole (2013); Cox, & Trotter (2017); Crotty (1998); Davis & Sumara (2006); Design Thinking for Educators (2013); Denzin (2017); Gray (2014); Guskey (2002); Kivuna & Kuyini (2017); Lefever, Dal & Matthíasdóttir (2007); Leong & Austin (2006); Manen (2018); Maxwell (2004); Maxwell (2012); Maxwell (2013); McKenney & Reeves (2012); Miles & Huberman (1999); Mills, Van de Bunt, & De Bruijn (2006); Munafò et al., (2017); Patterson & Williams (1998); Quiñones, Supervielle & Acosta (2017); Vansteenkiste, Lens, & Deci (2006); Wenger-Trayner (2013).

## Research Method Insights from the Global OER Graduate Network

So far we have discussed methods in research in quite general terms. In this section you can find short descriptions of specific research methods along with insider tips on their use from GO-GN researchers who have used them in their doctoral research. You can use these as a starting point for thinking about your own research approach.



### Action Research and Participatory Action Research

Action research is a form of self-reflective inquiry undertaken by participants in social situations to improve the rationality and justification of their practices, their understanding of these practices, and the conditions in which the practices are carried out. In the context of educational research this can involve practicing educators to the process of conducting classroom-based action research (Mertler, 2014).

It is an approach in which the action researcher and participants collaborate in the identification of the problem and co-designing the solution based on the diagnosis. Characteristically, action research relates to collaboration between researchers and stakeholders to solve organisational problems (Whyte et al., 1991).

In action research the researchers co-learns with a stakeholder group. In participatory action research they take a more active role as a member of a community. Participatory action research is sometimes used when an organisation needs to solve a problem but no clear line of inquiry is indicated. Alongside this kind of flexibility, another advantage of these approaches is that research can be tailored to a specific context while focusing stakeholders, allowing unanticipated solutions to emerge. This might be done to personalise a learning experience, or promote social inclusion (Warschauer, 2003; Lewis & Sanderson, 2011; Kemmis et al. 2013). Conversely, this approach might be considered disadvantageous because it may limit the ability to make generalised claims or apply what has been found in new contexts.

## Action Research: GO-GN Insights

Ada Czerwonogora used Action Research as part of a complex case study into reflective practice and the transformation of teaching through technological integration on behalf of the PRAXIS project:

*"The project approach was based on Open Science and Open Educational Practices as foundational frameworks to face the challenges of critical Educational Action Research... I see as an advantage the multi-methods approach, to provide a deep understanding of the complex case. However, this could result in a more difficult methodology... I think the pros are far more than the cons."*

Jenni Hayman used an action research approach in face-to-face workshops and on a MOOCs to determine the usefulness of an awareness and support strategy designed to increase the use of OER among post-secondary educators:

*"The method for my research was mixed method action research (MMAR) and it was defined by my institution as a requirement...I engaged in three cycles of research (a common practice for action research), each leading to more refined practices and greater participation. Although my personal tendency is toward qualitative methods, I found the requirement of a mixed method approach for my research extremely beneficial as a novice. I was required to learn and practice skills of both approaches and to learn how different types of data interact and combine to magnify insight. When qualitative and quantitative data agreed, this generated confidence for me that I was on the right path. When these data disagreed, I returned to the literature, and method descriptions to develop explanations and further refine my contexts and the contexts of my participants. Action research (similar to design based research) is grounded in practice and the design of experiences. It is personal and contextual and is therefore impossible to describe as objective or replicable. It is often used by educators to examine and improve some element of their teaching practice or the systems in which they work."*

Francisco Iniesto used action research within a Person-Centred Planning (PCP) perspective, designed to empower disabled learners to make their own choices and decisions by placing the individual at the centre of the planning process for improving accessibility in MOOCs:

*"Learners were a useful source of data to explore the accessibility barriers and their solutions in using the technology and the learning designs they come up against when interacting with MOOCs. The data from the interviews helped to understand their motivations, the current accessibility barriers they*



*have found, how they reacted to them, and their suggestions for desired solutions”.*

*Useful references for Action Research:* Caruth (2018); Danermark et al. (2002); Freire (1994); Heron & Reason (1997); Ivankova (2015); Kemmis, McTaggart & Nixon (2013); Lewis & Sanderson (2011); Mertler (2014); Smith (1999). Warschauer (2003); Whyte, Greenwood & Lazes (1991)

## Case Study

A Case Study is a research method involving a detailed examination and in-depth description of a particular empirical case. This can be done in many different ways, and the unit of analysis can vary (a person, an institution, a country, etc.). Case Studies can include both quantitative and qualitative evidence (Stake, 1995) and typically rely on bringing together many different articles of evidence from various sources to illuminate the case as a whole.

Case Studies benefit from having a developed theoretical framework before data collection begins (Yin, 2003). At the same time, the Case Study approach allows flexibility and can be used in exploratory contexts. This can be attractive to the researcher because it allows data collection to begin immediately (though there remains a need to impose a theoretical structure in the analysis phase). Consequently, Case Studies can be conducted at different levels of formality and replicability (Hetherington, 2013).

The case study research design can be used to test whether theories and models work in real contexts of application (Shuttleworth, 2008) and, conversely, to generate hypotheses and theories.

### Case Study: GO-GN Insights

Sarah Hutton used a hermeneutic phenomenological case study to illuminate a direct connection between undergraduate student participation in courses with a participatory OER authorship or open access publishing of student artefacts model, to the development of internal goals and deepened engagement:

*“Participatory OER development and an open pedagogical model provide the potential for students to have autonomous control over the development of course content, fostering greater intrinsic motivation, and therefore more successful and transferable learning outcomes. The resulting analysis creates a compelling case for the adoption of OER materials beyond the affordability argument, further advocating for the engagement of students in open scholarship at the undergraduate level.”*

Viviane Vladimirschi explored evidence-based guidelines in the context of Teacher Professional Development (TPD) for Brazilian fundamental education public school teachers by undertaking an intervention in one school. The main goal of the OER Development Program was to raise awareness and build teachers' knowledge regarding OER adoption and use:

*"The case study methodology used in this research is a very common approach within Educational Studies. It is also a fairly easy method to use and the analysis of multiple sources of data have the potential to not only generate new insights throughout the case study but also generate new theory. Theory-building is very well-suited to new research areas, which was the case of this research. However, there are some disadvantages to using this methodology. First, it is not possible to generalize the findings from a single case study. Second, achieving the balance between producing an overly complex theory or a narrow idiosyncratic theory is quite challenging. Theory generated by case studies must be testable, replicable and coherent. The TPD guidelines generated by this research are testable, replicable and pretty straightforward so I am confident I managed to achieve this balance. The Design Thinking for Educators approach (please note that it is not a method) that I used in this research for the face-to-face workshops I highly recommend to any researcher who wishes to undertake an intervention, especially in the K-12 sector. This approach not only enables researchers to gain more insight into potential solutions for introducing new professional practices, but also affords teachers multiple opportunities to participate in the process of determining how innovation may be best implemented. Its only potential disadvantage is that it requires a longer period of time of application during each of its distinct phases to obtain bottom-up buy-in to an innovation."*

*Useful references for Case Studies:* Hetherington (2013); Shuttleworth (2008); Stake (1995); Yin (2003)

## Content Analysis and Thematic Analysis

Content analysis is a research method for studying documents - broadly construed - and including formats such as texts, interview transcripts, images, audio or video (Bryman, 2011). In an educational context, Content Analysis can be used to systematically examine patterns in communication and discourse. This is done through a systematic reading or analysis of "texts" which are assigned codes to indicate the presence and proportion of meaningful content (Kimberly & Neuendorf, 2016).



Content analysis uses a descriptive approach in both coding of the data and its interpretation of quantitative counts of the codes. Thematic analysis is usually applied to a set of texts where the researcher closely examines the data to identify common themes, ideas and patterns of meaning that come up repeatedly (Clarke, Braun & Hayfield, 2015)., Thematic analysis provides a purely qualitative, detailed, and nuanced account of data (Vaismoradi, Turunen, & Bondas, 2013).

Content Analysis allows the analysis of social phenomena in a non-invasive manner. It is possible to analyse patterns of content using both quantitative and qualitative methods, systematically labelling the content (Finfgeld-Connett, 2014). Thematic analysis also provides a systematic and rigorous approach to theme development with well defined stages (Braun & Clarke, 2006).

### Content Analysis: GO-GN Insights

Johanna Funk used Content Analysis and a rigorous cycle of ‘filtering’ the resources with three sets of criteria (shared stakeholder perspectives; decolonising principles; evaluation framework criteria):

*“I questioned the extent of the openness to the cultural backgrounds and frameworks that the open and digital media could facilitate; what could educational institutions do to be more functional, culturally responsible and responsive for marginalized populations and knowledge subsystems such as Aboriginal and Torres Strait islander communities. Based on the cycles of evaluation, I found principles of best practice according to three sets of criteria I worked with”.*

*Useful references for Content/Thematic Analysis: Clarke, Braun & Hayfield (2015); Braun & Clarke (2006); Bryman (2011); Heath, Hindmarsh & Luff, (2010); Kimberly & Neuendorf, 2016; Finfgeld-Connett (2014); Saldaña (2016); Vaismoradi, Turunen, & Bondas, 2013).*

### Design-Based Research and Interventions

Design-Based Research (DBR) is a research methodology used by researchers in the learning sciences. DBR is a concentrated, collaborative and participatory approach to educational inquiry. The basic process of DBR involves developing solutions or interventions to problems (Anderson & Shattuck, 2012). An “Intervention” is any interference that would modify a process or situation. Interventions are thus intentionally implemented change strategies (Sundell & Olsson, 2017). Data analysis

takes the form of iterative comparisons. The purpose of this research perspective is to generate new theories and frameworks for conceptualising learning and instruction.

One positive aspect of DBR is that it can be employed to bring researchers and practitioners together to design context-based solutions to educational problems, which have deep-rooted meaning for practitioners about the relationship between educational theory and practice. DBR assumes a timeframe which allows for several rounds of review and iteration. It might be seen as a long-term and intensive approach to educational inquiry which is not really suitable for doctoral work, but increasingly there are examples of this approach being used (Goff & Getenet, 2017).

DBR provides a significant methodological approach for understanding and addressing problems of practice, particularly in the educational context, where a long criticism of educational research is that it is often divorced from the reality of the everyday (Design-Based Research Collective, 2003). DBR is about balancing practice and theory, meaning the researcher must act both as a practitioner and a researcher. DBR allows the collection of data in multiple ways and encourages the development of meaningful relationships with the data and the participants. DBR can also be used as a practical way to engage with real-life issues in education.

### DBR & Interventions: GO-GN Insights

Roberts (2019) used a design-based research (DBR) approach to examine how secondary students expanded their learning from formal to informal learning environments using the open learning design intervention (OLDI) framework to support the development of open educational practices (OEP).

*"We took some methods and research classes in my EdD program. I took Design-based research (DBR) and found it confusing and overwhelming. As such, I decided to take an extra course on case study research because it seemed to speak to me the most. In my mind I thought I could compare and contrast a variety of secondary school teachers integrating open ed practices. Through my initial exploration, I discovered that in my school district (30,000 + students), there are many teachers using OEP, but they were not interested in working "with" me, they wanted me to watch and observe them teach - then write about it. I began to understand that not only did I want to consider focusing my research on an emerging pedagogy (OEP) I also realized that I wanted to consider newer participatory methods. I did not think of DBR in this context when I took the initial course.*

*"I knew I wanted to work with a teacher and complete some kind of intervention in order to support them in thinking about and actually*

*integrating OEP. DBR was suggested to me multiple times, but I kept pushing it away. At the same time many of my supervisory committee and my peers did not think I should even consider DBR. I discovered that many researchers don't know about it and are fearful of it. As I learned, when you do choose DBR, it is kind of like being an open learner in that you believe in the philosophy behind the DBR process. You just "are" a DBR researcher and educator.*

*"It took many hours of reflection, reading about different examples of DBR, going to workshops and webinars about DBR in order to really see the possible benefits of DBR (collaborative, iterative, responsive, flexibility, balance between theory/ practice and relationships based) to get me to take the plunge..." (Verena Roberts)*

*Useful references for Design-Based Research: Anderson & Shattuck (2012); Design-Based Research Collective (2003); Goff & Getenet (2017); Sundell & Olsson (2017)*

## Discourse Analysis

Discourse analysis is a qualitative analysis approach for studying language about its social context. It aims to understand how language is used in real-life situations. Discourse analysis investigates the purposes and effects of different types of language, cultural rules and conventions in communication, how values, beliefs and assumptions are communicated and how language use relates to its social, political and historical context (Gee, 2014). Discourse analysis is often associated with critical inquiry approaches and perspectives because analysis of what people can reveal unequal power relations and inequality.



## Discourse Analysis: GO-GN Insights

Sarah Lambert analysed 24 key publications of open education to understand the gap between rhetoric and reality in educational outcomes relating to the promise of OER to make changes to educational access patterns (democratising knowledge etc.) The outcome of the analysis was the creation of a new definition of open education.

*"Motivated by the desire to understand and account for the failure of MOOCs to widen participation in education despite the early promise of*

*addressing global educational inequality, this thesis investigates alternative models of recent open online education program design and delivery that are more successful at enabling socio-economically disadvantaged learners. Social justice improves on current ill-defined notions of “openness” as the driver for more equitable forms of education. Secondly, recognitive justice is needed to correct gender and racial stereotypes and discrimination through recognising difference as valuable. Third, representational justice extends the rights of recognition to the right to have a voice to represent oneself in public and political debate, and to therefore be in a position to influence decisions effecting one’s life”*

*Useful references for Discourse Analysis:* Gee (2011); Gee (2014); Gee, Michaels & O’Connor (2017); Johnstone (2018); Lambert (2020); Rau, Elliker & Coetzee (2018)

## Ethnography

Ethnography is an explanatory account of life experiences in a social system based on detailed observations of what people do and express (Marcus, 1995).

Ethnography aims to study social and cultural aspects of a society and the researcher focuses to collect information for that. It focuses on behaviour of people with respect to the social setup they live in. This approach is highly immersive and provides one with a highly transparent and original account of information allowing the culture to speak for itself (Khan, 2018). The behaviour of the participants in each social situation is examined along with the group members' interpretation of such behaviour (Wolff, 2015). Ethnography uses both qualitative and quantitative research methods when studying specific groups that form a part of a larger complex society (Falzon, 2005).

### Ethnography: GO-GN Insights

Chena (2019) has developed a multi-sited ethnographic design including interviews, observations and a system analysis approach to track the development and implementation of open textbooks in Californian higher education. What makes multi-sited ethnography attractive is the prospect of systematically linking observations seemingly distant geographical, institutional, organisational, cultural, technological and cognitive settings. In this case, multi-sited ethnography does not set out from a particular site, but rather from the construction of specific social practices and phenomena within a relational network that connects several places (e.g., institutions, people, objects, projects and discourses).

*“The study demonstrates that binary conceptualizations of openness (i.e., “open” vs “closed”) based on formal characteristics (e.g., licensing) are not reflective of how people “do” openness in practice, and that different needs, values, priorities and interpretations of “open” give rise to different artifacts*

*in different disciplines and institutional settings. Moreover, the study shows how the frictions of open textbook production, circulation, and maintenance belie the fantasy of open textbooks as a dynamic interface prime for adaptation, modification and remix. What makes multi-sited ethnography attractive is the prospect of systematically linking observations from seemingly distant geographical, institutional, organizational, cultural, technological and cognitive settings. The promise of multi-sited ethnography is, far beyond the simple multiplication of field-sites, a new way of describing systemic relationships and the interdependency of the many 'parts and subparts' of the sociotechnical infrastructure in which technology, such as open textbooks, is embedded. A concern with multi-sitedness, on the other hand, is that by spreading the ethnographer too thinly across space, it jeopardizes anthropology's commitment to depth and thick description. If, especially, the overall duration of the fieldwork remains the same as in single-sited research, it will only be possible to visit and investigate each site comparatively briefly, and build relatively superficial relationships with key informants. Thus, one of the key strengths of ethnography is in danger of being lost. While this is an important corrective, I believe that, in the context of this study, the benefits of multi-sitedness outweigh the potential disadvantages. Since I followed the movement of content and ideas through the open textbook ecosystem, a systemic, multi-locale, multi-entity and multi-platform approach is fitting.*

*"My advice for anyone interested in multi-sited ethnography is to make sure they have a really good grasp of ethnographic methods, as well as systems theory. It is a lot harder, in many ways, than single-sited ethnography -- harder to plan and harder to execute, so be strategic and be prepared to get outside your comfort zone. I wouldn't recommend this method to anyone who's trying to finish their project in a very short amount of time. I also believe that it necessitates a highly interdisciplinary outlook and training.*

Walter Butler used Netnography (online Ethnography) to support research into virtual communities of practice and provide a framework to guide the research through various stages. It also supports the utilisation of further complementary methods (including interviews and content analysis) throughout.

*"Using Netnography holds several advantages for my research project specifically: it supports research online and provides a framework to work within guiding the research through various stages. It also supports the utilization of different methods throughout its stages. But it is a younger methodology, which may be disadvantageous to some. I am also applying a two-stage, sequential design. I feel that this approach allows me to address the research questions in a more strategic manner, and it also provides me*



*with a pacing-structure to the research (ie: let's figure this out first so that I can begin thinking about this other piece). This may take more time, though, than other processes, and it also leads to some ambiguity; ie: I couldn't give a precise prediction of how many participants I would have for the second stage of the research project, as it was contingent on the findings from the 1st stage. This may be problematic for some."*

*Useful references for Ethnography:* Angrosino (2007); Falzon (2005); Khan (2018); Marcus (1995); Marcus (1999); Williams et al. (2014); Wolff (2015).

## Evaluation Research

Evaluation research can be defined as a type of study that uses standard social research methods specifically for evaluative purposes, perhaps to assess the results of an intervention. Did the intervention meet its goal? Were there any unanticipated consequences? Some research methods are designed to be used as evaluation tools and employ dedicated techniques to this end. These include input measurement; performance measurement; impact assessment; service quality assessment; process evaluation; benchmarking; standards; quantitative methods; qualitative methods and methods drawn from Human-Computer Interaction (Powell, 2006).

### Evaluation: GO-GN Insights

Johanna Funk performed a developmental evaluation of 4 research projects that created learning resources. These learning outsources were all in one way 'open' and online.

*"I think it was so highly reflexive that it could be interpreted as circular; so a disadvantage was the cycles and circles of evaluation; I was answering the research questions each time with the criteria set filters; this resulted in me writing a LOT about what the resources did according to the three set of criteria; in three cycles of evaluation and interrogation. Pedantic is the word I would use. It did have a feel of luxury to it, though; being able to really concentrate on the processes in the resources down to a granular level, to see it from a number of perspectives and try to get right down to the mechanisms that helped make the resources different and more collaborative. This 'search for the things' was a bit circular and I had to find the things that we also not collaborative; that's the thing about looking for best practice; you also have to compare it to what's 'not good' in the resource but also know that there are relativity issue with what 'good' means, and to whom. So having a bird's*



*eye view on who the stakeholders are is helpful; as 'knowledge management tools,' learning resources have agenda-pushing potential we might not recognize."*

Francisco Iniesto devised an accessibility audit and then used it to evaluate the current accessibility of MOOCs from 4 major platforms: FutureLearn, edX, Coursera and Canvas. This evaluation comprised 4 components: technical accessibility, user experience (UX), quality and learning design; 10 experts were involved in its design and validation.

*"The combination of qualitative studies through interviews with MOOC providers and learners and the quantitative information provided by the MOOC survey data has provided an in-depth and multi-faceted insight into accessibility needs of MOOC learners. The MOOC accessibility audit has helped to identify accessibility barriers and the audit provides a tool that can be used and iteratively developed further to support the design and evaluation of MOOCs for accessibility. Interviews have involved MOOC providers and MOOC researchers. The aim was to explore the perspectives of platform and course developers on the importance of accessibility of the MOOC environment. The data from this study was useful to understand how to approach the next steps in this research. Interviewing individuals involved in MOOC development helped to understand how they cater for disabled learners, and the approaches they use to design accessible MOOCs. Additional evaluation involved disabled learners who had participated in learning via MOOCs. Learners were a useful source of data to explore the accessibility barriers and their solutions in using the technology and the learning designs they come up against when interacting with MOOCs. The data from the interviews helped to understand their motivations, the current accessibility barriers they have found, how they reacted to them, and their suggestions for desired solutions. Qualitative methods can help to explore a new area of research, the use of surveys in my cases helped to identify students to be interviewed to develop an understanding of their perspective on MOOCs."*

Useful references for Evaluation Research: Chang & Little (2018); Patton (2010); Powell (2006); Rutman (1977)

## Experimental and Quasi-experimental Research

Experimental and quasi-experimental research are methods where one or more independent variables are manipulated and applied to one or more dependent variables to measure their effect on the latter. The impact of the independent variables on the dependent variables is usually observed and recorded over time.

The experimental research is based on the comparison between two or more groups with a straightforward logic, which may, however, be challenging to execute (Ross & Morrison, 2004).

*Useful references for Experimental and Quasi-experimental Research:* Kazdin(2016)  
Ross & Morrison (2004); Sheremeta (2018)

## Grounded Theory

Grounded Theory (originally developed as Constant Comparative Method) is a flexible and systematic approach to data collection and the analysis of data. Grounded theory is a systematic methodology involving the construction of 'concepts' through regular gathering and analysis of data (Charmaz, 2006). Grounded theory is sought to give an account of the meaning that actors give to actions, events and objects, which leads to the reasons for their behaviour.

The main characteristic of grounded theory is its inductive reasoning (Glaser & Strauss, 1967). Grounded theory starts with the collection of qualitative data. As researchers review the data collected, repeated ideas, concepts or elements become apparent, and are tagged with codes which have been extracted from the data. As more data is collected, and re-reviewed, codes can be grouped into concepts, and then into categories. These categories may become the basis for a new theory (Glaser, 2002). Grounded theory is particularly useful for the creation of new theories due to its critical perspective. It requires a significant amount of data and can be criticised due to its subjectivity and open ended and process-oriented perspective ending in a narrative description more than a numerical estimation (Oliver, 2011)



### Grounded Theory: GO-GN Insights

Virginia Rodés used a qualitative methodology based on the Grounded Theory (together with the Biographical Method and Digital Ethnography) with twelve subjects, teaching staff of three public universities in three Latin American countries (Uruguay, Costa Rica and Venezuela) to understand the dimensions of the adoption of OER and Repositories of OER (ROER) by Latin American universities.

*"Grounded theory seeks to give an account of the meaning that actors give to actions, events and objects, which leads to the reasons for their social actions. This through inductive procedures, observing society from within, participating in the construction of categories of understanding both common sense, as members of society, and categories of theoretical*

*understanding, as researchers. What we incorporate as a problematic object of study and observation are precisely the first level typologies of the social world we are investigating. This means that the categories that the actors use in their current action in the first instance become an object of study and then, a second level observation is done, categorising the categories that the actors have performed on the first level. The Grounded Theory method moves research and researcher towards the development of theory (Charmaz and Mitchell, 2001). On the contrary, ethnography is based on the development of a complete description of a society or group of people and, therefore, provides the details of their daily lives. As a method, ethnography refers to the ways of studying; Know and inform about the world. According to Charmaz and Mitchell (2001) both grounded theory and ethnography have common roots in the sociology of the Chicago School with its pragmatic philosophical foundations. Since then, Grounded Theory and Ethnography have developed somewhat differently, however these approaches can complement each other.*

*“The Grounded Theory method can expedite fieldwork and move ethnographic research towards theoretical interpretation, while resorting to ethnographic methods can prevent studies based on grounded theory from dissolving into “fast and dirty” qualitative research. The biographical methodology gathers people's experience as they process and interpret it. This revelation of facts and interpretations explicitly or implicitly is filtered by the beliefs, attitudes and values of the protagonist. Through the biographical you can know meanings and contexts of meanings of the individual, as part of the social, or social structures and norms. The subject does not speak of the intimate as his sensation, but speaks of his social “I”. Our methodological approach also integrates the virtual ethnographic method (Hine, 2000), also called digital ethnographic methods, which make use of Internet and digital technologies for the collection and analysis of research data. Digital ethnography allows us to take advantage of the potential that technologies are offering to project knowledge about reality in contemporary society in greater depth, both in terms of the definition of the object of knowledge itself and the methodological design to access it. It is in this sense that digital ethnography techniques are incorporated into the design of my research. Within the framework of high technological availability scenarios, methods of the data collection techniques typical of the ethnographic methodology can be expanded to include web conferences, chat, videoconferences, forums, among others. From the use of this type of resources, digital narratives can be obtained, stories by subjects conceived as spokespersons or social representatives of the groups and communities.”*

Hélène Pulker followed Constructivist Grounded Theory methods of data collection and analysis to conduct an inductive qualitative study into the impact of reuse and adaptation of OER among language teachers.

*“Regardless of the chosen method, there are no absolute rules or formula for attending to qualitative data analysis or any ways to replicate perfectly the researcher’s analytical thought processes. The available guidelines and suggestions are not rules and therefore each qualitative researcher will have to find their own way through the data. As a result, each qualitative analysis is unique and therefore makes your research original. However, it relies on the researcher’s skills, who constantly has to make judgements and exercise creativity while applying the guidelines.*

*“The analysis depends on the analytical intellect and flair of the researcher and the human factor is the great strength and the fundamental weakness of qualitative inquiry. The great advantage is the flexibility. Throughout my data collection and analysis, I continuously analysed and questioned data through coding, re-coding, comparing codes, and finding sub-categories to arrive at the final analysis. This process allowed me to look for the emergence of unexpected trends and to make connections between the codes. As I observed and questioned the data, it became clear that participants were experiencing OER reuse in different ways. I could identify some similarities across a number of participants and was able to identify three different types of OER users, each having different characteristics. From that point onwards, I was able to explain the categories by comparing data from each type of user’s point of view and I arrived at a more comprehensive analysis of the reuse process that emerged from my study. The robustness of the data analysis lies in the cross comparison of categories and types of user, as I explain in my thesis.*

*“However, the big downside is the complexity of finding your way through the data because there are no preconceived codes or theoretical framework you can rely on. The codes developed in the analysis are largely provisional to start with and very often subject to much change. The principles of interpretative coding are not as straightforward a procedure as I had originally imagined. Coding for meaning is nebulous and has posed challenges. The gradual formation of codes and categories was, in my analysis, rather a tentative process whereby I could see that putting different ‘pieces’ together would yield different meanings. Thus, my experience was often one of going round and round the data. A further contributory factor to the difficulty in deciding on the label for a code was the absence of an overarching framework for looking at the data. In other words, I did not have an overarching view of which concepts might be included in the schema. I*

*would recommend students who wish to do grounded theory to think about the differences between inductive and deductive analysis and be very sure that they do not want to rely on theoretical framework to start with, because the grounded theory analysis takes a long long time, and when the researcher has possible avenues to explore to start with, it is easier to handle a set of data. I would also recommend the use of a data analysis software, even though the Constructivist grounded theorists advise against this for epistemological reasons."*

*Useful references for Grounded Theory: Charmaz (2006); Corbin & Strauss (2015); Glaser & Strauss (1967); Glaser (2002); James (2013); Oliver (2011)*

## Interviews & Focus Groups

Interviews are a qualitative research method and typically takes the form of a conversation where questions are asked to elicit information. The interviewer poses questions to the interviewee, in an alternating series of usually brief questions and answers. The questions may be highly structured, open-ended, or somewhere in between the two.

In phenomenological, phenomenographic or ethnographic research, interviews are used to uncover the meanings of central themes in the life world of the subjects from their own point of view (Ayres, 2008). A particular case are focus groups which are specially chosen groups of people whose reactions are studied in guided or open discussions to determine the responses that can be expected from a larger population (David, 1996).

The use of focus groups is intended to collect data through interactive and directed discussions by a researcher. It is a form of qualitative research consisting of a group conversation in which prompts are given to elicit sharing data about their perceptions, opinions, beliefs, and attitudes. Researchers should select members of the focus group carefully for compelling and authoritative responses (Bloor, 2001). Questions are asked in an interactive group setting where participants are free to talk with other group members. During this process, the researcher either takes notes or records the vital points he or she is getting from the group.

Advantages of the interviews include flexibility to the interviewers; and the ability to collect data about the non-verbal behaviour and spontaneity of the respondent. Advantages in focus groups include the diversity of voices and opinions included in those authoritative responses. Conversely, as with other qualitative methods, there can be issues with replicability. Conducting interview studies can be time-consuming and may provide less anonymity to participants. Care needs to be taken to avoid researcher bias (Bailey, 1994). Member checking (sometimes called

participant or respondent validation) is a technique that can improve the reliability of results - see Birt et al. (2016).

## Interviews & Focus Groups: GO-GN Insights

Penny Bentley used semi-structured interviews with 20 Australian primary and secondary teachers of STEM subject areas to explore and describe the experience of professional learning through open education (PLOE). Following the removal of transcripts used for the piloting and refinement of interview questions, data analysis and subsequent findings were based on the interviews of 16 teachers.

*"I chose to explore and describe the different ways professional learning through open education (PLOE) was experienced by Australian teachers of STEM subjects, not to focus on PLOE itself. In doing so I viewed experience as a relationship between teachers and PLOE (non-dualistic ontology) and assumed this relationship was the source of new knowledge (epistemology). I wanted to explore, understand and describe the different ways teachers experienced PLOE, from their perspective. This was an interpretive activity, situating my research in the interpretive paradigm. Also, describing the perspectives of teachers, in terms of what PLOE means to them, was research of a qualitative nature. However, there are a range of methodologies within the interpretive paradigm, such as ethnography, grounded theory, phenomenology and phenomenography.*

*"In order to justify my choice for this study I needed to consider the differences between these methodologies. I was not studying the culture of a group of teachers using the open Web to learn about STEM education (ethnography), although culture may be an aspect of how the phenomenon of PLOE is experienced. Nor was I generating a theory to explain the cause of social processes and interactions when teachers engaged in PLOE (grounded theory), although I was interested in understanding and describing the different ways these processes and interactions are experienced. Even though human experience is the focus of phenomenology and phenomenography, it is the phenomenographic focus on variation of experience, rather the focus on essence of experience made by phenomenologists, that made a difference to which methodology and methods I chose."*

Marjon Baas conducted interviews in both the first and the fourth study of her research. In the first study, interviews were used to explore teachers' current practices with OER and their need for support. The questions in the interview guide were based on the different layers of the OER Adoption Pyramid. Baas used

additional interviews to gain more insights into teachers' perceived value of an OER Community of Practice.

*"A mixed method approach was adopted in which a questionnaire was sent out to examine the current state of affairs within the context of my study. Afterwards, interviews were conducted to explore teachers' current practices with OER and their need for support. The instruments were designed based on the different layers of the OER Adoption Pyramid (Cox & Trotter, 2017). We used additional interviews to gain more insights into teachers' practices because previous research showed that there is still a lot of ambiguity around the term OER and so-called 'dark-reuse' could be prevalent which cannot be measured in quantitative measurements alone.*

*"The second study was a qualitative study to improve our understanding how teachers assess OER and how they move from initial assessment to adoption. In this qualitative study teachers were asked to collaboratively assess OER within their teaching subject. The aim of our study was to characterize what elements teachers take into account when assessing OER quality and not to generalize what defines a quality OER. We also explored by asking teachers to create an association map before and after the three months in which teachers could explore OER, if their perception changed during. We choose this qualitative design because it provides rich insights into the elements teachers' take into account when assessing OER rather than a quantitative measurement in which teachers are asked to self-reflect how they assess OER.*

*"The follow-up study focuses on an inter-institutional community around OER in which we will make use of a mixed-methods design. Qualitative data will be collected through interviews with teachers based on the five phases of the OER re-use process as defined by Clements and Pawlowski (2012). This data will be used to analyze how teachers make use of the inter-institutional community."*

Viviane Vladimirschi used focus groups to assess the overall effectiveness of the intervention in her research. These focus group conversations consisted of semi-structured, open-ended questions.

*"Focus groups are excellent for gaining new insights and assessing interventions. In my opinion, the biggest challenge is knowing what questions to ask in order to obtain useful data. I used Guskey's (2002) Multilevel Evaluation Framework to guide the semi-structured, open-ended interview questions. In my opinion, Guskey's model is effective and straightforward for educational interventions.*



*“Although the use of mixed methods can be excellent to collect and compare different sources of data enhancing the quality of data and promoting convergence and confirmation of findings, the researcher must feel comfortable with and be knowledgeable with both quantitative and qualitative data collection and analysis. I would also not recommend quantitative data methods for small sample populations.”*

*Useful references for Interviews & Focus Groups: Ayres (2008); Bailey (1994); Bloor (2001); Morgan (1996)*

## Literature Review, Systematic Review and Meta-analysis

Literature reviews can be a good way to narrow down theoretical interests; refine a research question; understand contemporary debates; and orientate a particular research project. It is very common for PhD theses to contain some element of reviewing the literature around a particular topic. It's typical to have an entire chapter devoted to reporting the result of this task, identifying gaps in the literature and framing the collection of additional data.

Systematic review is a type of literature review that uses systematic methods to collect secondary data, critically appraise research studies, and synthesise findings. Systematic reviews are designed to provide a comprehensive, exhaustive summary of current theories and/or evidence and published research (Siddaway, Wood & Hedges, 2019) and may be qualitative or quantitative. Relevant studies and literature are identified through a research question, summarised and synthesized into a discrete set of findings or a description of the state-of-the-art. This might result in a 'literature review' chapter in a doctoral thesis, but can also be the basis of an entire research project.

Meta-analysis is a specialised type of systematic review which is quantitative and rigorous, often comparing data and results across multiple similar studies. This is a common approach in medical research where several papers might report the results of trials of a particular treatment, for instance. The meta-analysis then uses statistical techniques to synthesize these into one summary. This can have a high statistical power but care must be taken not to introduce bias in the selection and filtering of evidence.

Whichever type of review is employed, the process is similarly linear. The first step is to frame a question which can guide the review. This is used to identify relevant literature, often through searching subject-specific scientific databases. From these results the most relevant will be identified. Filtering is important here as there will be time constraints that prevent the researcher considering every possible piece of evidence or theoretical viewpoint. Once a concrete evidence base has been

identified, the researcher extracts relevant data before reporting the synthesized results in an extended piece of writing.

### Literature Review: GO-GN Insights

Sarah Lambert used a systematic review of literature with both qualitative and quantitative phases to investigate the question “How can open education programs be reconceptualised as acts of social justice to improve the access, participation and success of those who are traditionally excluded from higher education knowledge and skills?”

*“My PhD research used systematic review, qualitative synthesis, case study and discourse analysis techniques, each was underpinned and made coherent by a consistent critical inquiry methodology and an overarching research question.*

*“Systematic reviews are becoming increasingly popular as a way to collect evidence of what works across multiple contexts and can be said to address some of the weaknesses of case study designs which provide detail about a particular context - but which is often not replicable in other socio-cultural contexts (such as other countries or states.) Publication of systematic reviews that are done according to well defined methods are quite likely to be published in high-ranking journals - my PhD supervisors were keen on this from the outset and I was encouraged along this path.*

*“Previously I had explored social realist authors and a social realist approach to systematic reviews (Pawson on realist reviews) but they did not sufficiently embrace social relations, issues of power, inclusion/exclusion. My supervisors had pushed me to explain what kind of realist review I intended to undertake, and I found out there was a branch of critical realism which was briefly of interest. By getting deeply into theory and trying out ways of combining theory I also feel that I have developed a deeper understanding of conceptual working and the different ways theories can be used at all stages of research and even how to come up with novel conceptual frameworks.”*

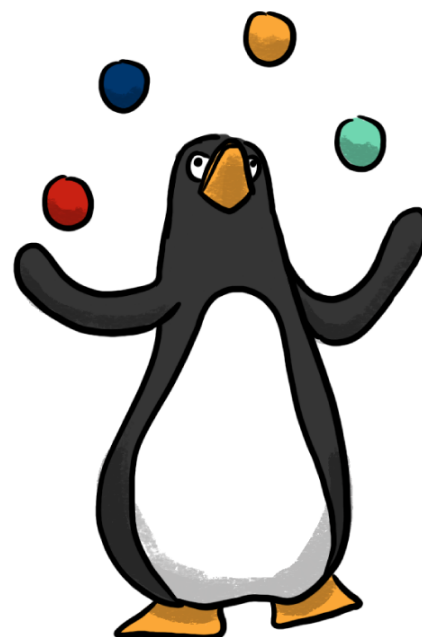
*Useful references for Systematic Review & Meta-Analysis: Finfgeld-Connett (2014); Lambert (2020); Siddaway, Wood & Hedges (2019)*

### Mixed Methods

Mixed methods is a research approach where searchers collect and analyse both quantitative and qualitative data within the same study (Shorten & Smith, 2017). Mixed methods research draws on potential strengths of both qualitative and quantitative methods. That approach allows researchers to explore diverse

perspectives and uncover relationships that exist between research questions (Creswell, 2009).

In a mixed methods approach, researchers have the possibility to use exploratory research to uncover new areas of research and inter-disciplines (Dominguez & Hollstein, 2014). Mixed methods design allows a pragmatic perspective in the research (Morgan, 2014) that can be applied to action research involving participants in the research process (Ivankova, 2015). A mixed methods approach supports the articulation of different techniques to deepen the study of some dimensions while making triangulation of data possible. Using mixed methods allows the study of a given phenomenon in a broader and deeper perspective, in order to obtain richer and more varied data which might draw from several approaches or paradigms. (See also the discussion on p.15 of this handbook.)



## Mixed Methods: GO-GN Insights

Aras Bozkurt used mixed-method and explanatory sequential design with a combination of methods for collection and analysis, including social network analysis, interview, observation and document analysis to identify interaction patterns and teacher-learner roles in connectivist MOOCs.

*"The purpose of my doctoral dissertation is to identify interaction patterns and teacher-learner roles in connectivist massive open online courses (MOOCs). To accomplish this purpose, mixed method and explanatory sequential design was used. For data collection and analysis, social network analysis, interview, observation and document analysis was used. Research findings were interpreted with the perspectives of connectivism, rhizomatic learning and social network theory."*

Jenni Hayman applied mixed-methods action research to determine the usefulness of an awareness and support strategy designed to increase the use of OER among post-secondary educators in Ontario.

*"The method for my research was mixed method action research (MMAR) and it was defined by my institution as a requirement. My program was a Doctor of Education (Ed.D) at Arizona State University and it was considered a professional program rather than a PhD. Students in the program were expected to have a full-time, related professional career in addition to*

*studying at a doctoral level. The timeline from program beginning to end, including defence of the dissertation was three years. I had some choice in the order of the mixed methods and selected a qualitative to quantitative data collection and analysis pathway that provide opportunities for me to learn more about educator needs and the quality of my instruments and method from colleagues and experts before launching the action of the study, professional development sessions for Ontario post-secondary educators, and collecting quantitative and qualitative data. I engaged in three cycles of research (a common practice for action research), each leading to more refined practices and greater participation. Based on some fantastic and creative qualitative analysis recommendations in Saldaña (2016) I used structural coding to analyse face-to-face participant data.*

*“Although my personal tendency is toward qualitative methods, I found the requirement of a mixed method approach for my research extremely beneficial as a novice. I was required to learn and practice skills of both approaches and to learn how different types of data interact and combine to magnify insight. When qualitative and quantitative data agreed, this generated confidence for me that I was on the right path. When these data disagreed, I returned to the literature, and method descriptions to develop explanations and further refine my contexts and the contexts of my participants.”*

Virginia Power is investigating the social, cultural and technical factors that mediate the relationship between social media affordances and the use of repositories for OER (ROER) using ‘cultural probes’ to collect data from 45 participants.

*“I wanted to find a method that would provide evidence of the psychology involved in using social media affordances (likes, ratings, reviews) and felt that a largely qualitative method would be useful. I had wanted to undertake some socio-technical system design but this is likely to happen once the thesis is finished to test out findings.*

*“A largely qualitative approach was used, with cultural probes selected as the method for data collection. Cultural probes (Gaver et al., 1999) utilise tools and tasks enabling the participant to reflect on their working environment (either physical or virtual) facilitating a deeper insight into motivation and use of the environment with limited researcher influence. Consequently, two elements were chosen as potentially suitable for data collection – a research journal for self-reflection and screencasts that would elicit both audio and video recordings from each participant.”*

*“Cultural probes if properly designed will often give users the opportunities to record their thoughts and feelings in their own particular context. They*

*also provide users with independence and minimal interference from the researcher. Often cultural probes can be used to triangulate against other independent data, such as focus groups or usability studies with the aim to improve reliability. Users need to be clearly briefed on the purpose of the research and exactly what they need to do and the amount of time needed to transcribe the data should not be underestimated."*

Paula Cardoso included interviews and surveys in her research conducted to understand the perceptions and practices of faculty in public higher education institutions in Portugal towards OERs.

*"We understood it was advantageous to articulate qualitative and quantitative techniques, as it may reveal or deepen the study of some dimensions of the same reality. In this research, the mixed methods approach, with sequential character, was useful in a double perspective: on the one hand, it allowed us to articulate different techniques to deepen the study of some dimensions in analysis, and on the other hand, it also presented advantages in terms of data triangulation. Finally, using mixed methods allows the study of a given phenomenon in a broader and deeper perspective, in order to obtain richer and more varied data, which can be better explored, giving greater strength and rigor to research."*

*Useful references for Mixed Methods:* Creswell (2009); Dominguez & Hollstein (2014); Edwards (2010); Ivankova (2015); Morgan (2014); Shorten & Smith (2017); Tashakkori & Teddlie (2010)

## Narrative Research

Narrative research aims to explore and conceptualise human experience as it is represented in textual form. Aiming for an in-depth exploration of the meanings people assign to their experiences, narrative researchers work with small samples of participants to obtain rich and free-ranging discourse.

*Useful references for Narrative Research:* Salkind (2002); Clandinin & Connelly (2004)

## Observation (Naturalistic & Analogue)

Observational research is a social research data collection tool that involves the direct observation of phenomena in their natural setting. Naturalistic observation has no intervention by a researcher. It is simply studying behaviours that occur naturally in natural contexts, unlike the artificial environment of a controlled laboratory setting. It permits observing and recording authentic behaviour. In participant observation, the researcher also intervenes in (and influences) the environment.

*Useful references for Observation:* Angrosino (2007); Levine et al. (1980); McLean & Connor (2018)

## Phenomenography

Phenomenography is a qualitative research methodology that investigates the qualitatively different ways in which people experience something or think about something (Bowden et al., 1997; Ashworth & Lucas, 1998). Phenomenography aims at studying the variation of ways people understand phenomena in the world. In simpler terms, phenomenography explores the variation in how different people conceive of learning experiences (Akerlind, 2005). Those who design and deliver professional learning can use empirical research rather than anecdotal evidence to inform the development and delivery of meaningful professional learning experiences.

### Phenomenography: GO-GN Insights

Penny Bentley used phenomenography to explore the experience of professional learning through open education (PLOE) from the perspective of teachers as adult learners. The study was conducted to inform the design and delivery of meaningful professional learning to other teachers seeking to learn about STEM education on the open Web.

*“Phenomenography is not a widely used methodology. There is variation in literature on phenomenography around aspects of theory, methodology and*

*method. This made it difficult for me, as a novice, solo researcher to comprehend and discuss with my supervisors who are not experts in the field. It is time consuming to conduct phenomenographic data analysis on a huge amount of data.*

*"I wanted to explore, understand and describe the different ways teachers experienced PLOE, from their perspective. This was an interpretive activity, situating my research in the interpretive paradigm. Also, describing the perspectives of teachers, in terms of what PLOE means to them, was research of a qualitative nature. However, there are a range of methodologies within the interpretive paradigm, such as ethnography, grounded theory, phenomenology and phenomenography.*

In order to justify my choice for this study I needed to consider the differences between these methodologies. I was not studying the culture of a group of teachers using the open Web to learn about STEM education (ethnography), although culture may be an aspect of how the phenomenon of PLOE is experienced. Nor was I generating a theory to explain the cause of social processes and interactions when teachers engaged in PLOE (grounded theory), although I was interested in understanding and describing the different ways these processes and interactions are experienced. Even though human experience is the focus of phenomenology and phenomenography, it is the phenomenographic focus on variation of experience, rather the focus on essence of experience made by phenomenologists, that made a difference to which methodology and methods I chose.

*"Phenomenography enables me to describe variation in the lived experiences of PLOE from the perspective of teachers experiencing this phenomenon. This is important since much of the literature on professional learning does not include the different views of teachers, but focuses on aspects of professional learning that others consider important. It is this focus on variation of experience, particularly the meaning of experience, that I see as having a practical application to the professional learning of Australian teachers of STEM subject areas.*

*"If you are new to research, and working alone, I would advise you not to conduct a phenomenographic study unless you have people who are familiar with this methodology to support you. Give yourself plenty of time and limit the number of participants what is recommended in the literature. If you don't know any phenomenographers in your institution, seek out networks of practice on social media. Read the seminal literature on phenomenography, then read it again."*

A [phenomenographic data collection](#) was conducted by Chrissi Nerantzi using a collective case study approach to gain insights into the collective lived collaborative

open learning experience in two authentic cross-institutional academic development settings with collaborative learning features.

*“Twenty two individual phenomenographic interviews with academic staff and other professionals supporting learning in higher education were conducted and coded. This generated over 80,000 words of data. The findings illustrate that collaborative open learning was experienced as two dynamic immersive and selective patterns. Boundary crossing as captured in the categories of description and their qualitatively different variations, shaped that experience and related to modes of participation; time, place and space; culture and language as well as diverse professional contexts. Facilitator support and the elasticity of the course design also positively shaped this experience. The community aspect influenced study participants’ experience at individual and course level and illuminated new opportunities for academic development practice based on cross-boundary community-led approaches. The findings synthesised in the phenomenographic outcome space, depicting the logical relationships of the eleven categories of description in this study, organised in structural factors, illustrate how these contributed and shaped the lived experience, together with a critical discussion of these with the literature, aided the creation of the openly licensed cross-boundary collaborative open learning framework for cross-institutional academic development, the final output of this study.*

*“Doing phenomenography on your own can be challenging. It’s worth considering conducting the analysis with a colleague and discussing thoughts, ideas and dilemmas. Even if you are working on a doctoral study, reach out for help as these discussions with another phenomenographer will be invaluable. Also important for bracketing purposes, which means only the voices of your study participants count and not yours. That is also important in making sure your questions are framed openly and you are facilitating deep reflection without trying to influence or direct your study participant in any way. Large amounts of data generated was a challenge in this study as everything counts in phenomenography and is used and needs to be categorised which is inclusive but it can be time consuming and the process of analysis is complex. Using a tool such as NVivo for example can help during the analysis stage. Experimenting with smaller data sets first would*





*be my suggestion so that you can familiarise yourself with the tool.*

*Useful references for Phenomenography:* Åkerlind (2005); Ashworth & Lucas (1998); Bowden. & Green (2005); Bowden & Walsh (2000); Marton (1981); Marton (1986); Marton & Booth (1997); Tight (2016)

## Phenomenology

Phenomenology is the study of phenomena. It has its roots in the philosophical movement initiated by Husserl (Beyer, 2011) which suspended traditional philosophical approaches which try to understand the fundamental nature of reality in favour of focusing on analysis of phenomena as they are experienced. This approach allows for an objective appreciation of phenomena that are considered to be subjective.

Phenomenology has been applied extensively in a range of diverse disciplines (Friesen et al., 2012). In educational science, phenomenological descriptions are used to articulate the interests, aims, approaches, cultures, interactions, structures and reflections of educators and/or learners in a particular context.

### Phenomenology: GO-GN Insights

Sarah Hutton conducted in-depth interviews with students and content analysis to connect shared internal goals supported by participation in an open publishing model where students are provided the opportunity to self-publish openly online or contribute to OER materials for the course.

*“A phenomenological case study provides the opportunity for creating a rich narrative surrounding a shared experience. This method can help researchers establish a better understanding of individual meanings, and how subjects uniquely comprehend the world around them. Phenomenology and grounded theory pair well together for data collection and analysis, allowing for a more natural emergence of new ideas and thematic elements across a shared experience.*

*“A disadvantage to this type of approach is the sheer volume of data that must be collected and sorted through to create that narrative. While recommendations on numbers of study participants may vary slightly between researchers, the more data that is collected over a longitudinal period, the stronger a pattern can be indicated as interviews are analyzed. In-depth interviews produce a large amount of data for analysis, and for a course case study, 3 interviews should be completed (beginning, middle, end) to complete a longitudinal thread of student experience and development throughout the course. Another disadvantage is that, similar to*

*other qualitative data methods, phenomenology may be taken less seriously by policy makers than other larger-scale quantitative studies."*

Michael Paskevicius used a phenomenological approach with self-identifying open education practitioners. This explores how OEPs are being actualised in formal higher education and impacting learning design, and describes the ways educators are bringing elements of openness into their everyday teaching and learning practice through educational technologies.

*"I employed an empirical phenomenological approach in my PhD study to investigate the personal social construction and 'lifeworld' human experience of individuals engaging with OEP (Giorgi, 1997; Gray, 2013). At the core of phenomenological research is a pursuit of understanding mental directedness or consciousness by investigating individuals' explanations grounded in their subjective experiences (Aspers, 2009). Empirical phenomenological research seeks to portray the essence of the conscious experience of others, essentially how they perceive the world, exploring what their experiences means to them, and provide a comprehensive description while recognizing the importance of social structure and context (Moustakas, 1994). Social structures are represented through the individual's interpretation and construction of meaning in the world, and this social meaning construction can be studied empirically by the researcher (Aspers, 2009). The phenomenological approach aims to understand the general or typical essential structures of individual experience, based on the descriptions of those experiences. In doing so, I seek to understand not what 'is' in the world but to understand why conscious individuals say that something 'is' (Giorgi, 1997).*

*"Trialing research questions can strengthen a phenomenological study as it allows one to engage with and become familiar with the research space, learn about the context in which individuals of interest work, and gather feedback from potential participants or those operating in similar situations (Aspers, 2009). The interview questions, conducted using the Zoom synchronous meeting service, were trialed first with my supervisor, who uses open educational practices in her undergraduate and graduate teaching. My supervisor was able to provide some feedback on the questions from her perspective as a faculty member. As a result of this process, we adjusted some of the language and sequencing of the questions."*

Jessica O'Reilly includes an interpretivist phenomenological analysis (IPA) methodology in her study of OER enabled pedagogy.

*"The idiographic focus of the IPA approach fits very well with my research question, which is interpretivist, emergent, and very focused on*

*contextualized individual experience and sensemaking. One clear advantage that I see is the combination of psychological, interpretive, and idiographic "lenses" within the approach. IPA is well-suited, I think, to questions concerned with the experiences of a fairly concentrated and homogenous participant sample. A potential disadvantage to my IPA study will be the reliance upon interview data and the huge amount of work involved with transcription and analysis."*

*Useful references for Phenomenology:* Clandinin & Connelly (2004); Friesen, Henriksson & Saevi (2012); Giorgi (1997); Gray (2014); Manen (2018); Maxwell (2013); Smith, Flowers & Larkin (2009)

## Social Network Analysis

Social media analytics is the process of gathering and analysing data from social networks. (Scott, 2000). Social Network Theory is the study of how people or groups interact with others inside their network. The three types of social networks are ego-centric networks, socio-centric networks, and open-system networks (Borgatti, & Lopez-Kidwell, 2011).

The objective of social network analysis (SNA) is to understand the interactions between each of the members of the network. These connections, called relationships or ties, are at the heart of what this analysis seeks to study and understand. The reasons why the individuals interact and how they interact their level of closeness (Borgatti et al., 2009). SNA provides both qualitative and quantitative data of online learning communities.

### Social Network Analysis: GO-GN Insights

Aras Bozkurt used SNA to track digital footprints of online participants and map and visualize online learning community.

*"For data collection and analysis, social network analysis, interview, observation and document analysis was used. Research findings were interpreted with the perspectives of connectivism, rhizomatic learning and social network theory.*

*"According to the demographic findings of the research, learners in connectivist massive open online networks are distributed globally in time and place, many participate from English spoken countries, and 89% of the learners come from low-context cultures while 11% comes from high context cultures. Participants are individuals that are somehow connected to the education field; or students or instructors in higher education. When examined in terms of interaction patterns, unified-tight crowd community*

*pattern was observed in connectivist massive open online course networks. The nodes in this kind of networks have strong connections to one another and significant connections that bridge sub-groups. Learners of this type of networks tend to communicate with each other frequently and share a common interest. These networks are composed of a few dense and/or densely interconnected groups where conversations usually swirl around and increase its density towards the center, involving different people at different times.*

*“Research findings additionally demonstrated that connectivist learning environments require relatively few hops to communicate and interact with the learning community, and confirmed the theses proposed in the Small World Phenomenon and the Global Village. SNA provides both qualitative and quantitative data of online learning communities. However, it fails to provide phenomenological qualitative data.”*

Some researchers collect this phenomenological data separately. For example, in addition to analysing network structures, Katy Jordan held co-interpretive interviews with 18 participants, to understand the significance and construction of their academic social networks.

*“My PhD study addressed the question of how academics use dedicated social networks through mixed methods social network analysis. First, an online survey was conducted to gain contextual data and recruit participants (n = 528). Second, ego-networks were drawn up for a sub-sample of 55 academics (reflecting a range of job positions and disciplines). Ego-networks were sampled from an academic SNS and Twitter for each participant. Third, co-interpretive interviews were held with 18 participants, to understand the significance of the structures and how the networks were constructed.*

*“My methods changed direction (subtly) twice during the course of my PhD. The focus was always on the structure of academic online social networks, but the level at which I looked at the networks changed. Originally I had planned to look at networks at a larger scale - such as the entire UK HE sector on Academia.edu. I changed tack to focus on academics' individual (personal, ego-) networks instead, for two reasons. First, ethically, it is a lot more sound to capture an ego-network - at this level, you can get the participants' consent. Second, in order to be able to understand the structures involved. For example, I could see interesting structural features in the OU networks, but network metrics can only tell you so much. By sampling personal networks, the structures could be meaningfully discussed with the*

*participants themselves, in order to understand the significance and characteristics of different network features from their perspective. Combining digital (scraped) data with co-interpretive interviews offers much greater insight into the digital, open practices behind the network structures.*

*Useful references for Social Network Analysis:* Borgatti & Lopez-Kidwell (2011); Borgatti et al. (2009); Dominguez & Hollstein (2014); Edwards, G. (2010); Hansen, Shneiderman & Smith, (2010); Jordan (2018); Kozinets (2015); Newman (2018); Scott (2000); Wenger, Trayner & de Laat (2011)

## Surveys & Questionnaires

Surveys involve asking a series of questions to participants. They can be administered online, in person, or remotely (e.g. by post/mail). The data collected can be analysed quantitatively or qualitatively (or both). Researchers might carry out statistical surveys to make statistical inferences about the population being studied. Such inferences depend strongly on the survey questions used (Solomon, 2001) meaning that getting the wording right is crucial. For this reason, many test out surveys in pilot studies with smaller populations and use the results to refine their survey instrument.

Sampling for surveys can range between self-selection (e.g. where a link is shared with members of a target population in the hope they and others contribute data and share the survey) through to the use of specialised statistical techniques ("probability sampling") that analyse results from a carefully selected sample to draw statistical conclusions about the wider population. Survey methodologies therefore cover a range of considerations including sampling, research instrument design, improving response rates, ensuring quality in data, and methods of analysis (Groves et al., 2011).

One common question format is to collect quantitative data alongside qualitative questions. This allows a more detailed description or justification for the answer given to be provided. Collecting ordinal data (e.g. ranking of preferences through a Likert scale) can be a way to make qualitative data more amenable to quantitative analysis. But there is no one superior approach: the crucial thing is that the survey questions and their phrasing aligns with the research question(s) correctly.

Surveys are widely used in education science and in the social sciences more generally. Surveys are highly efficient (both in terms of time and money) compared with other methods, and can be administered remotely. They can provide a series of data points on a subject which can be compared across the sample group(s). This provides a considerable degree of flexibility when it comes to analysing data as several variables may be tested at once. Surveys also work well when used alongside other methods, perhaps to provide a baseline of data (such as

demographics) for the first step in a research study. They are also commonly used in evaluations of teaching & learning (i.e. after an intervention to assess the impact).

However, there are some noteworthy disadvantages to using surveys. Respondents may not feel encouraged to provide accurate answers, or may not feel comfortable providing answers that present themselves in a unfavourable manner (particularly if the survey is not anonymous). “Closed” questions may have a lower validity rate than other question types as they might be interpreted differently. Data errors due to question non-responses may exist creating bias. Survey answer options should be selected carefully because they may be interpreted differently by respondents (Vehovar & Katja Lozar, 2008).

### Surveys & Questionnaires: GO-GN Insights

Marjon Baas collected quantitative data through a questionnaire among teachers within an OER Community of Practice to explore the effect of the activities undertaken to encourage the use of the community on teachers’ behaviour in relation to OER.

*“I used several theoretical models (Clements and Pawlowski, 2012; Cox and Trotter, 2017; Armellini and Nie, 2013) to conceptualise different aspects (that relate to) OER adoption. This enabled me as a researcher to design my specific research instruments.”*

Judith Pete had a deliberate selection of twelve Sub-Saharan African universities across Kenya, Ghana and South Africa with randomly sampled students and lecturers to develop a representative view of OER. Separate questionnaires were used for students (n=2249) and lecturers (n=106).

*“We used surveys to collect data across three continents. Online survey tools were very helpful in online data collection and, where that was not possible, local coordinators used physical copies of the survey and later entered the information into the database. This approach was cost-effective, versatile and quick and easy to implement. We were able to reach a wide range of respondents in a short time. Sometimes we wondered, though, whether all those who responded had enough time to fully process and understand the questions that they were being asked. We had to allocate a significant amount of time to curating the data afterwards.”*

Samia Almousa adopted Unified Theory of Acceptance and Use of Technology (UTAUT) survey questionnaire, along with additional constructs (relating to information quality and culture) as a lens through which her research data is analysed.

*"In my research, I have employed a Sequential Explanatory Mixed Methods Design (online questionnaires and semi-structured interviews) to examine the academics' perceptions of OERs integration into their teaching practices, as well as to explore the motivations that encourage them to use and reuse OERs, and share their teaching materials in the public domain. The online questionnaire was an efficient and fast way to reach a large number of academics. I used the online survey platform, which does not require entering data or coding as data is input by the participants and answers are saved automatically (Sills & Song, 2002).*

*Using questionnaires as a data collection tool has some drawbacks. In my study, the questionnaire I developed was long, which made some participants choose their answers randomly. In addition, I have received many responses from academics in other universities although the questionnaire was sent to the sample university. Since I expected this to happen, I required the participants to write the name of their university in the personal information section of the questionnaire, then excluded the responses from outside the research sample. My advice for any researcher attempting to use questionnaires as a data collection tool is to ensure that their questionnaire is as short and clear as possible to help the researcher in analysing the findings and the participants in answering all questions accurately. Additionally, personal questions should be as few as possible to protect the identity and privacy of the participants, and to obtain the ethical approval quickly."*

Olawale Kazeem Iyikolakan adopted a descriptive survey of the correlational type. The research design examines the relationship among the key research variables (technological self-efficacy, perception, and use of open educational resources) and to identify the most significant factors that influence academic performance of LIS undergraduates without a causal connection.

*"The descriptive research design is used as a gathering of information about prevailing conditions or situations for the purpose of description and interpretation (Aggarwal, 2008). My research design examines the relationship among the key research variables (technological self-efficacy, perception, and use of open educational resources) to identify the most significant factors that influence academic performance of Library & Information Science undergraduates without a causal connection. Ponto (2015) describes that descriptive survey research is a useful and legitimate*



*approach to research that has clear benefits in helping to describe and explore variables and constructs of interest by using quantitative research strategies (e.g., using a survey with numerically rated items).*

*“The reason for the choice of descriptive survey research instead of ex-post-facto quasi-experimental design is that this type of research design is used to capture people's perceptions, views, use, about a current issue, current state of play or movements such as perception and use of OER. This research design comes with several merits as it enables the researcher to obtain the needed primary data directly from the respondents. Other advantages include: (1) Using this method, the researcher has no control over the variable; (2) the researcher can only report what has happened or what is happening. One of the demerits of this type of research design is that research results may reflect a certain level of bias due to the absence of statistical tests.”*

*Useful references for Surveys & Questionnaires: Aggarwal (2008); Fowler (2014); Groves et al., 2011); Lefever, Dal & Matthíasdóttir (2007); Ponto (2015); Sills & Song (2002); Solomon (2001); Vehovar & Manfreda (2008); Vehovar, Manfreda, & Berzelak (2018)*

## Conclusion & Reflection Prompts

This section has presented research method as a journey from “deep” philosophical considerations to specific approaches to collecting and analysing data. Obviously there is much more that could be said: many books have been written about individual methods and philosophical takes described above. But hopefully this guide provides a useful overview of a topography that can be confusing and intimidating.

Looking in more detail at how different methods have been used by doctoral researchers from GO-GN can be a useful way to see the possibilities with different methodologies. You can find a list of completed theses at the end of this handbook. For future editions we hope to incorporate more insights from the network and cover even more methods.

We have shown how openness can be a relevant consideration in all aspects of the research process. In conclusion, we invite you to reflect on the ways in which openness can frame or enhance your own research.

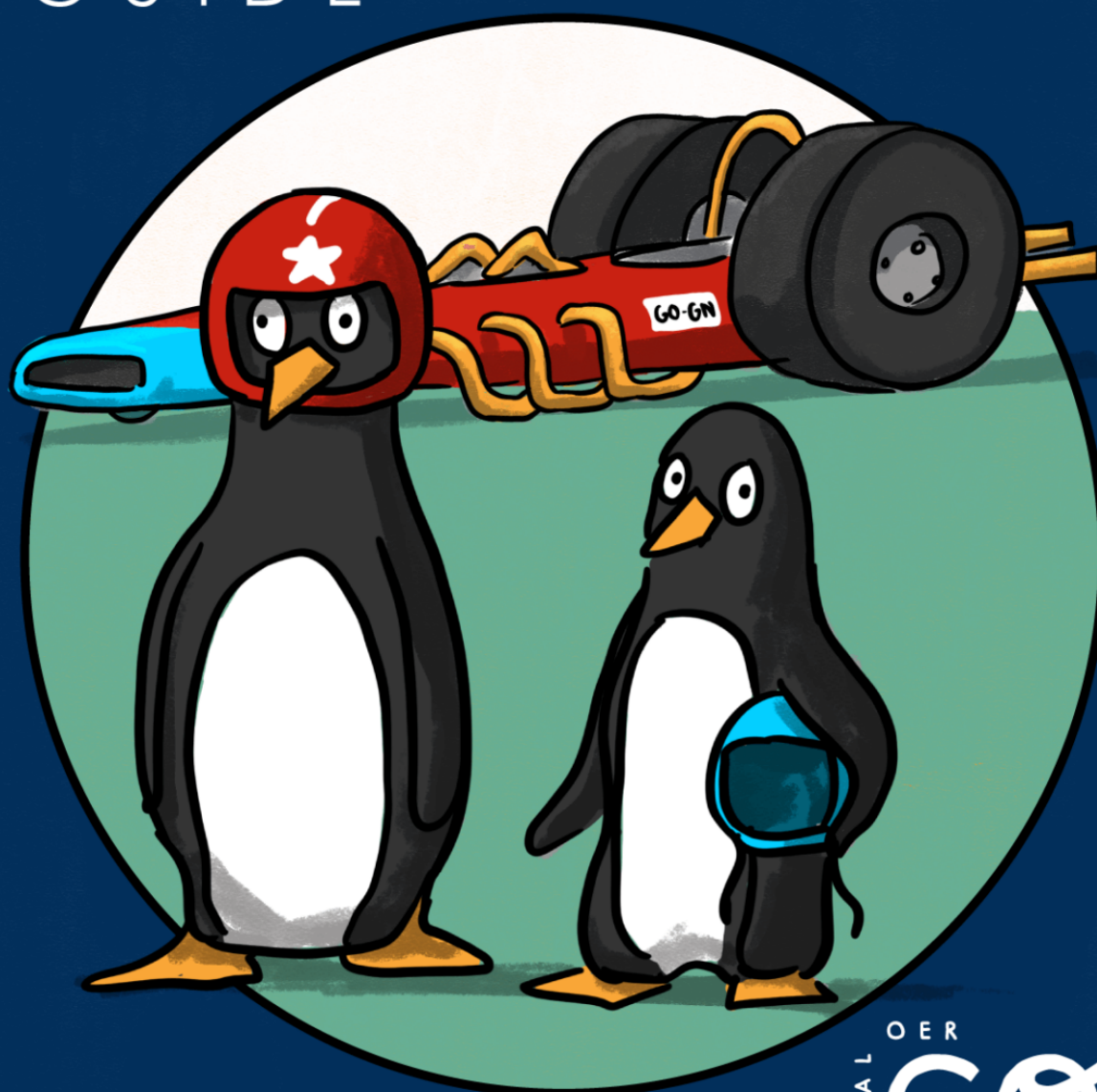
How do you frame your research? What motivates it?

- Describing what is happening (e.g. learner diversity in MOOCs)
- Identifying patterns (e.g. how are networks changing learner interactions?)
- Challenging existing narratives (e.g. ‘digital native’)
- Focus on something overlooked (e.g. importance of sociocultural factors)
- Supporting professional practice (e.g. educator development)
- Developing new theories
- Describing new trends (e.g. open education)
- Refine/redefine roles (e.g. MOOCs)

What will be the value of answering your research question? Can open approaches enhance or add value?

- Directly influencing practice
- Producing tools
- Sharing data for re-use
- Open access publication
- Developing open networks

# CONCEPTUAL FRAMEWORKS GUIDE



GLOBAL OER  
**GO  
GN** NETWORK  
GRADUATE

# Conceptual Frameworks Guide

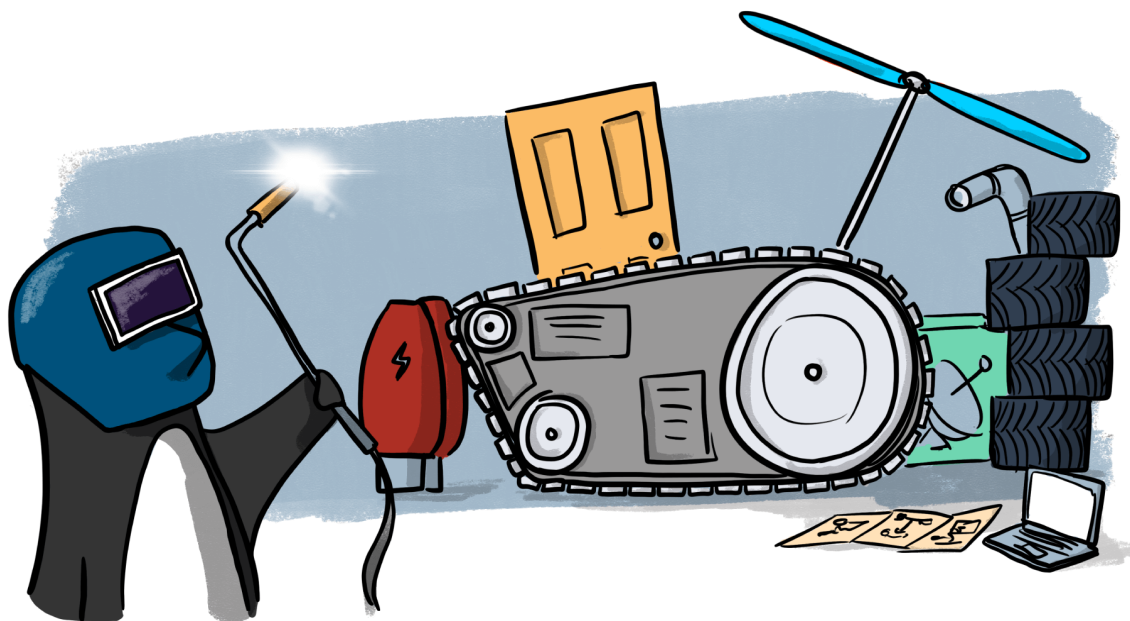
## Introduction

This *GO-GN Conceptual Frameworks Guide* can be considered a sister volume to the Research Methods Handbook, and it was always planned that we would produce such a companion piece. The rationale here is similar: this is an area where doctoral students have expressed concerns and they aren't always sure where to find help. Once again we draw on the collective intelligence of GO-GN researchers, this time to capture and describe the ways that conceptual frameworks can support doctoral level research (with a focus on open education). We begin by discussing the wider theoretical considerations before moving to specific conceptual frameworks and their use in open education research.

## What is a 'Conceptual Framework'?

If you're a doctoral researcher (in any discipline) or someone who produces research in a professional capacity you've perhaps encountered the phrase "conceptual framework". Sometimes a whole chapter of a Ph.D or Ed.D might be given over to investigating the relevance of different frameworks for an area of inquiry, or to synthesizing several frameworks together to ground the approach taken to answering a specific research question. Alternatively, you might not have heard much mention of conceptual frameworks or how they relate to what you are trying to achieve with your research.

A conceptual framework brings together a set of ideas and articulates the different concepts that will be used in a study or research project. Because this is highly contextual - and often specific to a particular research question or approach - there aren't really any general rules that cover how to do this. In addition, there is a lot of ambiguity and impreciseness in the language used to describe this stuff. Sometimes people talk about theoretical frameworks, or models, or a 'theory of action' that guides their research project. But do these mean different things? And are there differences between disciplines?



In an empirical project the conceptual framework might be used to determine the kinds of questions to ask in a survey, or which data points to collect and focus on. A conceptual framework might be used to generate a hypothesis that is to be tested, or to facilitate the interpretation of results. On the qualitative side a conceptual framework might be used to provide the right kinds of descriptions at different stages of the research process; to identify or explore categories of analysis; or to guide and refine the conclusions drawn by a study. All of these things can happen in a single project!

Given the importance and centrality of these frameworks, it might be surprising to learn that relatively little has been written about using them in research. There's certainly a lot less published about this than research methods or methodology, for instance. (Though different methods often come with specific conceptual frameworks built in or with a more obvious alignment). So, to start making sense of all this we begin by looking at some of the papers that offer systematic guidance or understanding of the role of conceptual frameworks in research. As this guide progresses we'll bring in perspectives from GO-GN members on their experiences with developing and using conceptual frameworks.

## Conceptual Frameworks and Research Perspectives

In this section we will be guided by several texts (notably Kivunja, 2018; Leshem & Trafford, 2007; Jabareen, 2009; Passey, 2020; Ravitch and Riggan, 2017) that have offered insights into the role of conceptual frameworks and describe the range of their possibilities. We'll present several approaches which often overlap but have some key differences. One thing they all have in common is starting from the observation that the language around theories and frameworks can be ambiguous and confusing.

Kivunja (2018) argues on the basis of experience as a supervisor, external examiner and teacher of research methods that "problematic for many students is the inability to articulate differences between theory, theoretical framework and a conceptual framework for a proposed research project". Many doctoral candidates - and supervisors - often use the terms interchangeably and this can be unhelpful.

Leshem and Trafford (2007) similarly found that many doctoral candidates struggle to articulate the way they conceptualise research and that this can have implications for the success of a study.

Understandings	Misunderstandings	Consequences
Clarifying the research issue(s)	Omitting paradigm(s) which locate, and critique, research issues	Focus upon research methods at the expense of concepts
Identifying concepts from a 'survey of the literature'	Not visualising linkages between various concepts	A framework was not devised nor its function appreciated
Designing research, and explaining methodology and the methods	Overlooking strategic and guiding roles for conceptual frameworks	Lack of explicit and cohesive relationships throughout the research

*Ph.D candidates' comprehension of conceptualising research (Leshem & Trafford, 2007:95)*

Kivunja (2018) suggests five critical questions that should be asked about your “theory”, “theoretical framework” and “conceptual framework”:

1. What does each of these terms mean?
2. When and how should each be used?
3. What purposes does a theoretical framework serve?
4. How do you develop a theoretical framework for your research proposal or thesis?
5. What does a good theoretical framework look like?

The key distinction Kivunja (2018) makes is between a theoretical framework and a conceptual framework. The former is intimately connected with a systematic literature review while the latter describes the researcher’s approach to answering a research question. They draw upon Kerlinger and Lee (2000) to define theory as “a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena.” Theories emerge from data over time as lawlike relationships are identified and undergo iterative improvement. For an approach to qualify as a theory, it must be logical and coherent, with clear boundaries over where it is supposed to apply. Theories clearly explain the relations between variables and make specific and substantive predictions about outcomes involving the variables, principles and constructs that comprise the theory. (Conceptual frameworks can be much looser in their cognitive mapping: as Rudestam and Newton (1992:6) have it, a conceptual framework “is simply a less developed form of a theory”.)

This kind of emergent, general presentation of lawlike relationships is generally too large and unwieldy to be repeated in its entirety as part of a research project. So, theoretical frameworks are used to structure and scaffold research by summarising and describing relevant theoretical aspects from the work of experts in the field. Seen this way, a theoretical framework is very much a tool: “a theoretical coat hanger for your data analysis and interpretation of results” (Kivunja, 2018:46). Selecting and describing a theoretical framework is a scholarly activity which needs to systematically ground one’s research in the existing literature.

“Ideally, your theoretical framework should emerge from your literature review. This contrasts significantly with your conceptual framework, which, in the main, comprises your own thinking, about all the different components of your research (including the theoretical framework), as explained above.” (Kivunja, 2018:52)

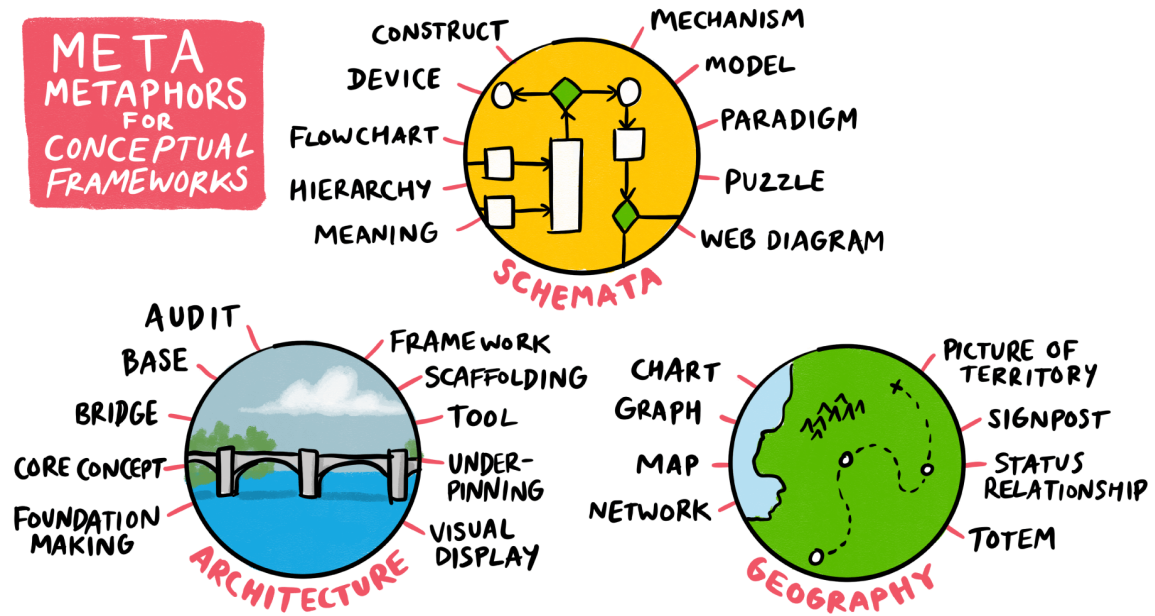
Kivunja (2018) goes on to use the metaphor of a house with different rooms to explain how a theoretical framework is only a part of one's conceptual framework: "A helpful analogy might be, that while the conceptual framework is the house, the theoretical framework is but a room that serves a particular purpose in that house. The purpose of the room could, for example, be the kitchen, or living room, or bathroom or bedroom, or garage. While each room has a unique purpose, no single room can serve all the functions that a house serves. This analogy should help you to appreciate better why these two terms should never be used interchangeably. Only in a one-room 'house', would the house and room be one and the same thing. Most houses are not built like that" (Kivunja, 2018:47).

It's worth noting that the metacognitive aspects of conceptual frameworks need not be explicitly written up in a doctoral thesis with their own chapter or justification as this is not expected in the same way that it is for theoretical backgrounds. Given their centrality this might be a bit surprising, but perhaps explains why people sometimes use terms like "theoretical framework" and "conceptual framework" interchangeably.

Kivunja's (2018) advice is to concentrate on being really clear and explicit about the roles of theory, theoretical foundation and conceptual foundation, always having one eye on the practical side of things. How are these constructs helping you to answer your question? How do they influence or improve the process of gathering and analysing data? You should be able to explain all aspects of the models and frameworks used in your project and justify their use, showing how they are grounded in recent scientific literature. Thus, the conceptual framework relates to how you operationalise and metacognize your research project. It's your master plan, your approach, your roadmap and your unique perspective. As Miles and Huberman (1984:33) put it, your conceptual framework is "the current version of the researcher's map of the territory being investigated".

Leshem & Trafford (2007) point out that metaphors like this are common ways of trying to describe a conceptual framework - so much so that they often come to replace the conceptual framework itself. This risks the conceptual framework becoming something that obscures rather than illuminates. They identify three clusters of 'meta-metaphors': architectural, geographic and schematic.





*Categorisation of conceptual framework metaphors  
(based on Leshem & Trafford, 2007:104)*

## Positionality

This idea of using conceptual frameworks as a guide to managing your project as a whole is also employed by Ravitch and Riggan (2017). They suggest six key framing questions for scholars (pp.18-19):

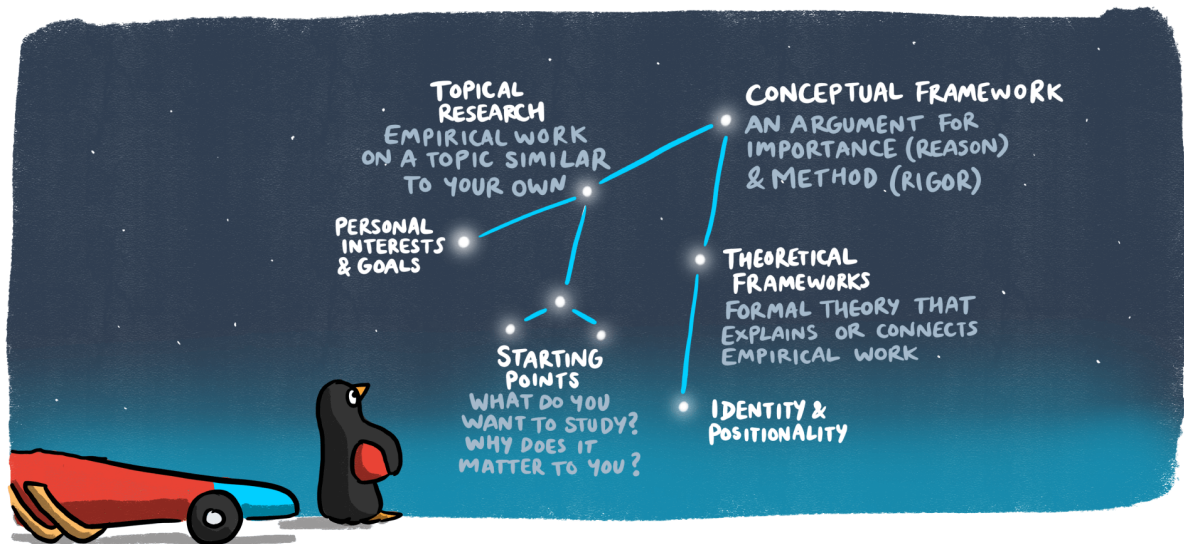
1. What do I want to study?
2. Who cares?
3. What literature do I need to include, and when have I had enough?
4. How do I know what kind of data to collect and how to analyze them?
5. How does my own position and way of seeing the world shape the framing and execution of my research?
6. How do I deal with surprises in the data or unexpected developments in the field?

Ravitch and Riggan (2017) emphasize the importance of positionality and personal epistemology in their approach to conceptual frameworks. Six of the nine chapters of their book are given over to highly detailed accounts from individual researchers which describe how they designed and used conceptual frameworks. (We do a similar thing later on in this *Guide*.) The goals, interests and identities of the researcher inform the development of a conceptual framework in tandem with engaging with theory and scientific literature. This means that conceptual frameworks should be understood as integrative and dynamic: they will continually evolve over the lifecycle of a project. The key thing is that useful and informative critical connections continue to be made as an understanding of the whole develops.

Some care needs to be taken here regarding the importance of personal opinion. Just because a researcher has some beliefs about something which might ground or influence their work, it does not mean that the conclusions they draw are necessarily valid. There is a balance to be struck between personal insights and scientific method(s); even in a highly participatory approach (such as Action Research) there are processes and good practices that support the rigour and validity of the research.

“[W]hile personal interests and goals, social location and positionality, topical research, and theoretical frameworks are what comprise a conceptual framework, we would never expect to

see them organized according to these elements. In finished form, a conceptual framework is organized and expressed as an argument. Each step of that argument is a proposition justified by the topical and/or theoretical literature.” (Ravitch and Riggan, 2017:13)



*Elements of a Conceptual Framework (adapted from Rogers, 2016:1710)*

We see here a similarity with Kivunja’s idea that the conceptual framework is the overarching organising principle for a research project. Ravitch and Riggan (2017) also frame this as an attempt to overcome using terms like conceptual/theoretical framework interchangeably and ambiguously.

## Conceptual Frameworks as Underpinning Constructs

A consistent typology of terms which are sometimes used interchangeably is provided by Passey (2019; 2020). Passey (2020) begins with the idea that doctoral students are universally required to make some original contribution to knowledge - selecting a conceptual framework could be considered a characteristic challenge of doctoral research - but this is often not very well defined at an institutional level. Some doctorates are more focused on pure research while others relate more to policy or practice. This means that the “underlying constructs” like theories, conceptual frameworks and so on can take on quite different forms. The point is also made (in Passey, 2019) that educational technology - which straddles these kinds of divides more than other disciplines - can be particularly vulnerable to ambiguity and a lack of clarity. This may also translate to even more ambiguous or interchangeable language being used to describe the scholarly basis or organising principle of a research project.

Contributions to policy and practice should be considered in the context of underpinning models, frameworks or theories. How conceptual frameworks are defined or understood has implications for research, so it's important to explicitly identify and recognise originating research. The epistemological and ontological stance within a study may shape the choice and role(s) of models, frameworks and theories, so it's necessary to critically engage with the assumptions of the researcher and the project. Research questions should be framed in ways that allow alternative ways to view factors and features relating to underpinning models, frameworks or theories. Finding contextual matches, shifts, amendments or additions can all offer important contributions to the field and reflect the way that approaches evolve (and hopefully improve) over time.

Passey's (2020) goal is to provide a robust description of these fundamental types of 'underpinning' construct. This table shows some basic types along with examples from educational technology.

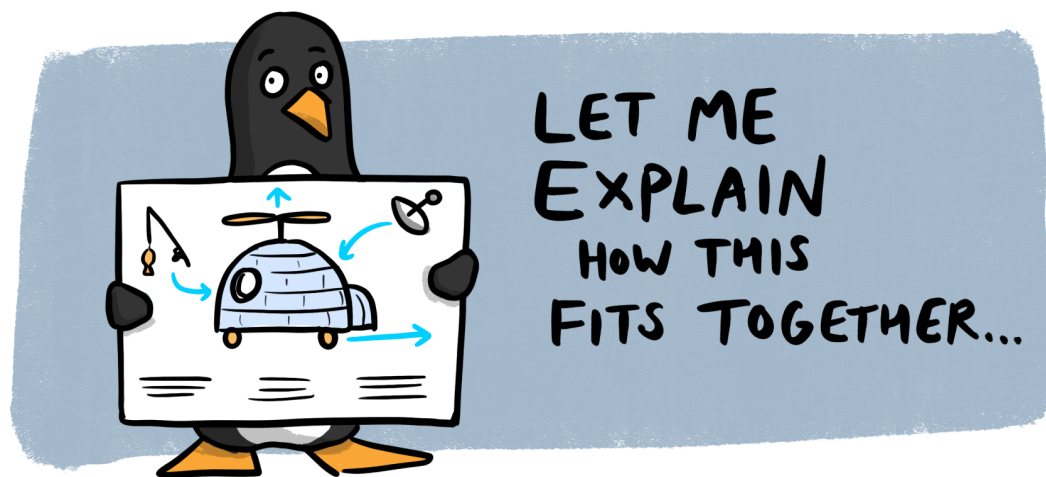
Form of underpinning	Description	Examples
Model	A model holds for a given case or stated population, arising from context-specific research, often indicating main features of influence or contribution	Technology Acceptance Model (TAM) (Davis, 1989)  Diffusion of Innovation (Rogers, 2003)  Pathways to Implementing Change (Corbett & Rossman, 1989)
Conceptual Framework	Conceptual frameworks tend to be more flexible and descriptive, identifying factors or criteria that have influence on a particular field within the more major features	Technological, Pedagogical and Content knowledge (TPACK) (Mishra & Koehler, 2006)  Discovery Learning (Bruner, 1961)  Experiential Learning (Kolb, 1984)
Theoretical framework	A theoretical framework arises from outcomes beyond a single study, based on one or more theories	Social Creative Constructivism (Passey, Dagien, Atieno & Baumann, 2019)  Human Motivation (Maslow, 1943)
Theory	Theories consider a broader and deeper concern or context, suggesting the detail of what might be more general, beyond a given context	Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003)  Social Constructivism (Vygotsky, 1978)  Constructionism (Papert, 1986)  Behaviourism (Skinner, 1953)

*Examples of forms of underpinning constructs (Passey, 2020:3)*

Passey's systematic approach perhaps differs from those of Kivunja and Ravitch and Riggan in that conceptual frameworks are treated as one possible perspective rather than the defining or guiding point of orientation for other aspects of a study. However, it would still be possible to use a conceptual framework in this way: it's

really a difference of emphasis. Passey just suggests that other uses of theory are possible. This can be guided by a pragmatic interest in the desired outcome and impact of research, and often reflects one's positionality.

Multiple 'constructs' might be used for different purposes in a study, but there is a balance to be struck between multi-theory approaches which can illuminate different aspects of a research activity and trying to make several different (and perhaps incompatible) theories coherent together. (Passey notes that mixed methods approaches are concerned with data collection and not to be confused with multi-theory frameworks.) As we saw previously, the only real test is how well it all hangs together: "in research, strength of argument often determines possibility in these respects" (Passey, 2020:6).



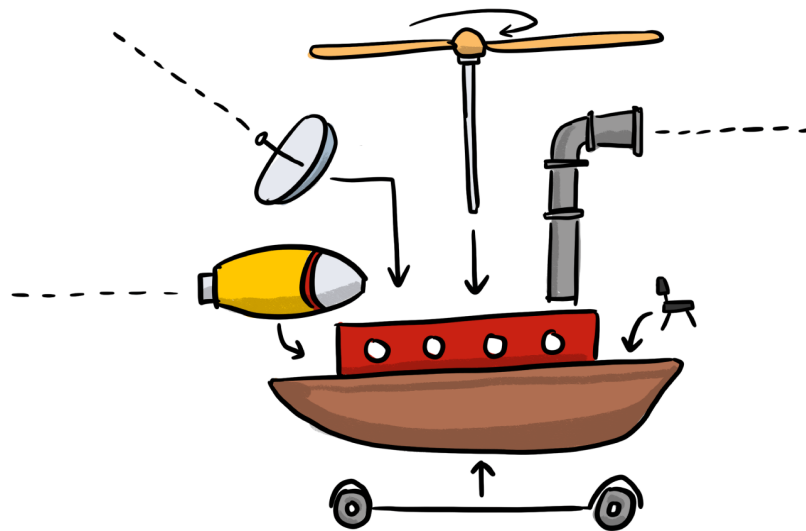
What does it mean for everything to hang together? This may vary from case to case but could be summed up as a consistent approach which is as complicated as it needs to be, but no more complex than that. Passey (2020) suggests that it is key that the relationships between different models, frameworks or theories are well understood and explained clearly, aligned to the appropriate research paradigms. Care needs to be taken that ontology, epistemology, methodology, data collection and analysis are organised in a sensible way that builds on the critical perspectives of those whose work is being built upon or added to. Here we can see the relationship between conceptual framework and method is ideally going to be close, explicable and defensible. Passey provides the following example. (There's a blank version of this table for your use [here](#).)

Elements of your research approach and design	Position or stance, and implications	Possible underpinning constructs
Focus or title of the study	An evaluative study exploring the motivational benefits arising from uses of digital technologies	Evaluative frameworks, motivational theories of learning, and models of digital technology practices might all be relevant and possible
Ontological and epistemological position	Ontological position is subjective, concerned with the interpretation that individual consciousness brings; epistemological position is constructivist, concerned with individual constructions of reality	Social constructivism as an overarching theoretical conception is possible
Methodological approach	The methodological approach is interpretivist, related to a subjectivist position, particularly concerned with context in different locations, and considering multiple meanings	Contextual constructivism (Cobern, 1991) as a more related theoretical framework could be chosen
Methodological design	From an interpretivist perspective, a multiple case study design will be taken, in order to consider different contexts, and to gather evidence of a subjective nature to consider how motivational benefits are being evaluated at individual and contextual levels	Multiple case study design with evaluative features focusing on educational technologies (Scanlon, Blake, Issroff & Lewin, 2006) could be selected
Data collection methods	Data will be gathered in six different institutional settings, where the same digital technologies are being used, where mixed methods gather evidence about uses - from documentary evidence, observed by the researcher, described by the teacher, and motivation from uses can be evaluated by learners	Evaluation of motivational outcomes are framed through the self-determination theory of Deci and Ryan (2002) and self-theories of Dweck (1999); data gathering instruments are created using these underpinning frames
Data analysis methods	Data are analysed both qualitatively and quantitatively, from interpretivist and subjectivist perspectives	Motivational frames are used as ways to identify forms of motivation, while data are analysed in and across cases

*An example of multiple forms of underpinning constructs for a study (Passey, 2020:9)*

## Deconstructing the 'Concept'

An alternative take on how to think about conceptual frameworks is offered by Jabareen (2009). Like Passey, Jabareen emphasizes that multidisciplinary perspectives are often necessary for addressing contemporary research questions, and sees qualitative approaches as the best way to investigate complexity by bringing together different bodies of knowledge.



Jabareen's approach to conceptual frameworks is to see them as oriented towards deeper understanding rather than a theoretical explanation (which is what quantitative approaches offer). Following Deleuze & Guattari (1991:15-21) Jabareen (2009) offers a post-structuralist account of 'concepts' as historical and defined by their component parts and relation to other concepts.

1. A conceptual framework is not merely a collection of concepts but, rather, a construct in which each concept plays an integral role.
2. A conceptual framework provides not a causal/analytical setting but, rather, an interpretative approach to social reality.
3. Rather than offering a theoretical explanation, as do quantitative models, conceptual frameworks provide understanding.
4. A conceptual framework provides not knowledge of "hard facts" but, rather, "soft interpretation of intentions"



5. Conceptual frameworks are indeterminist in nature and therefore do not enable us to predict an outcome.
6. Conceptual frameworks can be developed and constructed through a process of qualitative analysis.
7. The sources of data consist of many discipline-oriented theories that become the empirical data of the conceptual framework analysis. Although conceptual framework analysis generates theories or conceptual frameworks from multidisciplinary bodies of knowledge, metasynthesis, a systematic synthesis of findings across qualitative studies, seeks to generate new interpretations for which there is a consensus within a particular field of study.

Like Passey, Jabareen (2009) emphasizes the multivalent nature of conceptual frameworks and sees this as a way to bring together important ideas from different disciplines or sectors. One difference though, is that Jabareen's response to the vagueness or ambiguity around conceptual frameworks is to reserve them for qualitative attempts to draw an understanding from several "texts" through a process of theorization.

The process for this is presented as follows:

1. Mapping the selected data sources
2. Extensive reading and categorizing of the selected data
3. Identifying and naming concepts
4. Deconstructing and categorizing the concepts
5. Integrating concepts
6. Synthesis, resynthesis, and making it all make sense
7. Validating the conceptual framework
8. Rethinking the conceptual framework

This process is reminiscent of a systematic literature review, but focused on refining conceptual frameworks arising from texts rather than summarising the state of the art with respect to a research area. When doctoral learners are asked to write a literature review early on in their project the idea of developing a conceptual framework as part of this is often only implied. (As we saw above, there often is no requirement to present one's conceptual framework or even spend much time problematizing one.) Making explicit the connections between textual sources and elements of one's conceptual framework helps both the researcher and (ultimately) the supervisor(s) and examiner.

Weaver-Hart (1988) argued that conceptual frameworks are unclear because the term itself brings together something abstract (conceptual) with something concrete (a framework). Jabareen's (2009) work can be seen as an attempt to close this gap by emphasizing the close relationship between concepts and their textual (concrete) grounding.

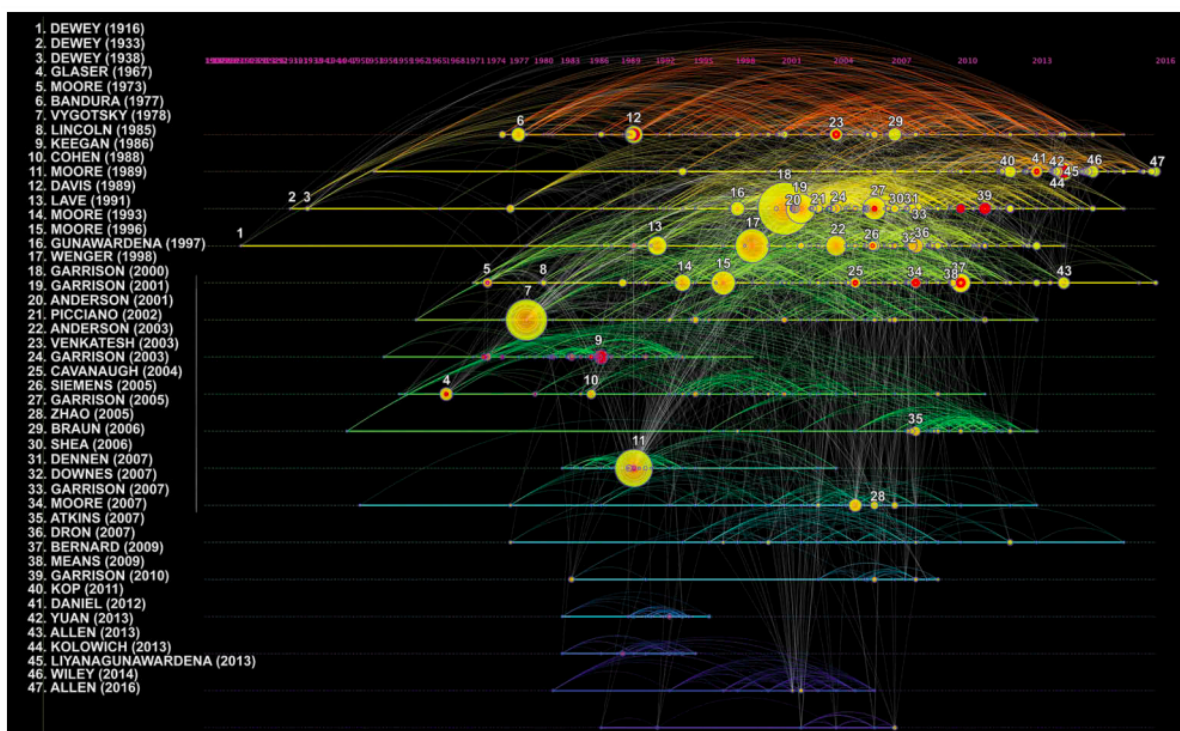
A deconstructive approach is not going to be relevant for every project (although following this rubric can generate interesting perspectives). However, the attention to detail Jabareen (2009) brings to the role of text(s) in qualitatively grounding a conceptual framework is generally useful, especially if one understands things like interviews, personal statements, audio-visual resources and interactive media as "texts".

## Social Network Analysis and Conceptual Frameworks

The conceptual frameworks presented here are means of integrating research findings into theory. An alternative approach is to take a more quantitative, neutral stance and through data mining and analysis, allow a framework to emerge. One such approach is to use citation or social network analysis (SNA).

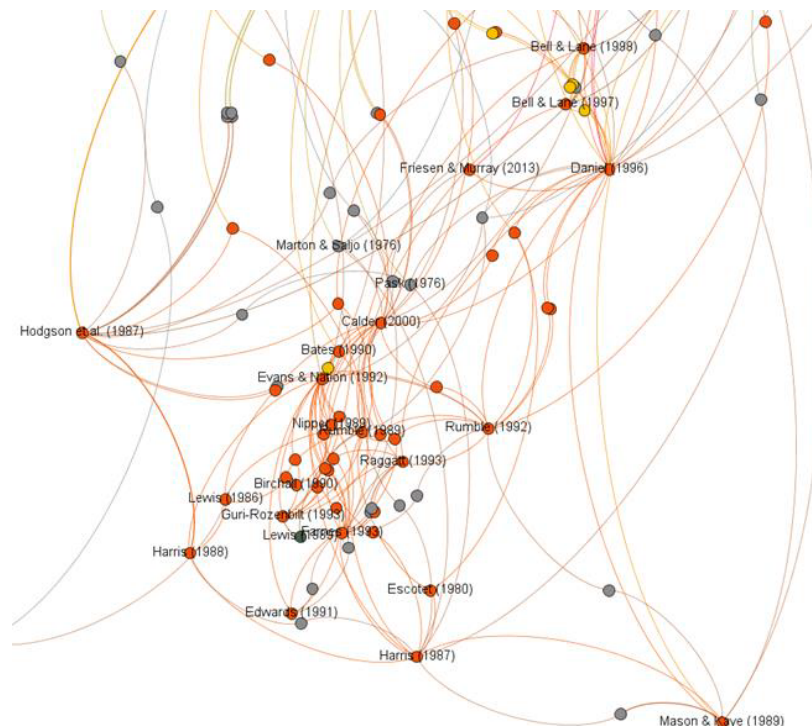
SNA can be understood as a toolkit of different metrics where social relations can be conceived of as links between individual nodes. This allows novel insights to be gained in terms of the structure of communities, resources and nodes as well as the importance of key connections. This approach is commonly applied to social networks, such as Twitter, but can also be applied to the literature within a field, a technique known as citation analysis. The literature cited in any academic publication then can be “conceived of as a network where each reference is a node, linked to another node (the publication it is cited in) through a tie which represents the social practice of a citation” (Weller *et al.*, 2018).

For example Dawson, Gašević, Siemens and Joksimovic (2014) used this approach to analyse the citations in papers at the Learning Analytics and Knowledge annual conferences from 2011 to 2013. Bozkurt (2019) reviewed the pattern of 54,940 references across 1685 articles and used social network analysis to examine the distance education field.



*Timeline Visualisation of Distance Education (Bozkurt, 2019)*

Weller *et al.* (2018) similarly implemented the technique to map the open education landscape.



*A citation analysis network (From Weller et al., 2018)*

What these analyses have in common is that they do not impose a framework on the literature, but rather allow one to emerge from the relationships between citations. (A conceptual framework may also be applied to interpret the emergent structure, however.) This technique can be used to provide quantitative support for claims about discourse over time, or to describe how paradigms and practices evolve. One effective approach can be to combine network analysis with more traditional analysis in order to triangulate or contrast perspectives.






























## Use Cases for Conceptual Frameworks

We have seen that there are use cases for conceptual frameworks throughout the research life cycle. Leshem & Trafford (2007) see one of the main benefits of using conceptual frameworks in doctoral research as introducing more granular and explicit descriptions into the research process. This can include things like:

- modelling relationships between theories;
- reducing theoretical data into statements or models;
- explicating theories that influence the research;
- providing theoretical bases to design, or interpret, research;
- creating theoretical links between extant research, current theories, research design, interpretations of findings and conceptual conclusions.

These kinds of descriptions are useful at all stages of the research process, including generating ideas; refining a research question; establishing viable routes through data collection & analysis; interpreting results; keeping track of important variables; pulling everything together; communicating results and visualising future research. By making what you are doing more explicit and more clear, unhelpful ambiguities are reduced. The research process is more focused and holistic when an effective conceptual framework is in place.

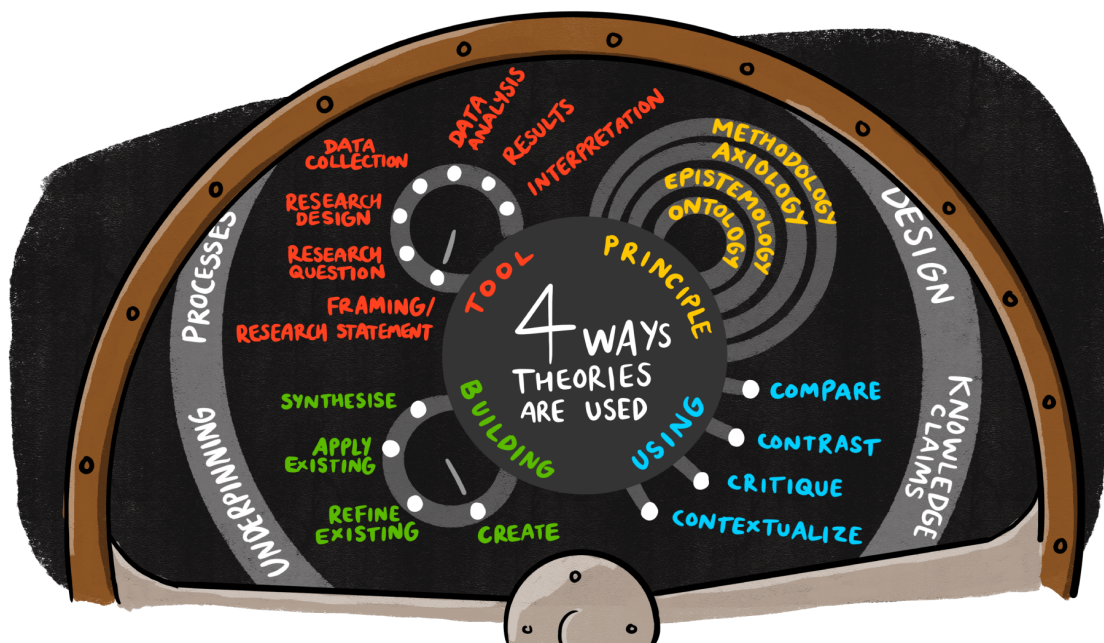
The following matrix shows how conceptual frameworks can be understood to apply throughout the research process.

Research Lifecycle Stages	Use Cases for Conceptual Frameworks						
	Describe	Guide Decisions	Provide Context	Generate ideas	Organise	Analyze	Explain
Framing / Research Statement							
Literature Review							
Research Question							
Research Design							
Data Collection							
Results							
Interpretation							

*Use Cases for Conceptual Frameworks through the Research Lifecycle*

Building on Oliver (2002), Passey (2020) makes a distinction between four fundamental ways that theories are used in research and scholarship. From each of these basic modes a range of different elements in the research process may be implied.

- Theory as tool - used throughout the research process
- Theory as principle - informing methodological and philosophical position
- Theory building - created anew, or refined/synthesized from others
- Theory using - engaging with knowledge claims



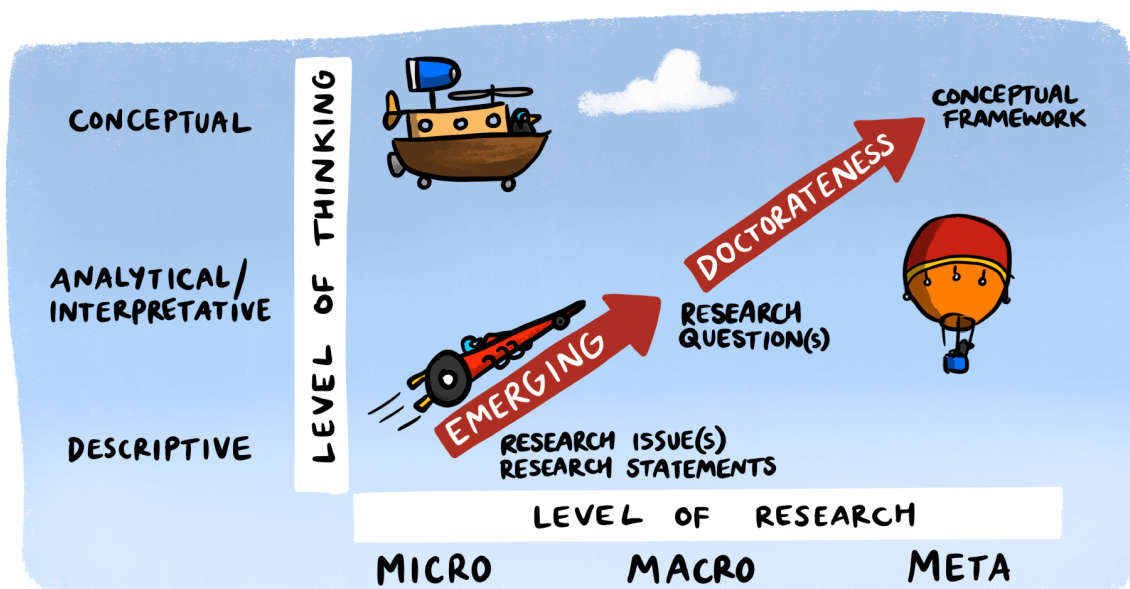
*Uses of Theory in Research (based on Passey, 2020)*



## Conceptual Frameworks and 'Doctorateness'

Conceptual frameworks don't necessarily have to have an explicit philosophical justification in the way that is expected of research methods; we saw for instance in Kivunja's approach a role for 'topical' research. Though conceptual frameworks can be flexibly used, it's still important to retain a meaningful connection between a conceptual framework and the research method proposed for a study.

Leshem & Trafford suggest on the basis of empirical data about Ph.D vivas (Trafford & Leshem, 2002a; 2002b) that successful conceptual frameworks progress in tandem with a doctoral research project. Higher order cognition is required to successfully navigate the process of moving through practical stages such as the analysis and interpretation of data, and the conceptual level is where the reflective and meta-reflective advances are made. They present this metacognitive aspect as the essence of doctoral learning which is explored in a viva: "doctoral candidates who raise their levels of thinking beyond descriptive and content aspects of research will increasingly display doctorateness" (Leshem & Trafford, 2007:102). Conversely, research which produces data which is descriptive of some phenomenon but doesn't reflectively connect this to wider concepts might be seen as failing to meet the standards expected.



*Technical, practical and conceptual aspects of doctoral research  
(based on Leshem & Trafford, 2007:103)*



Berman & Smyth (2015:134) come to a similar conclusion, arguing that “ higher level conceptual thinking and the development of an explicit conceptual framework is a core element of quality doctoral work”.

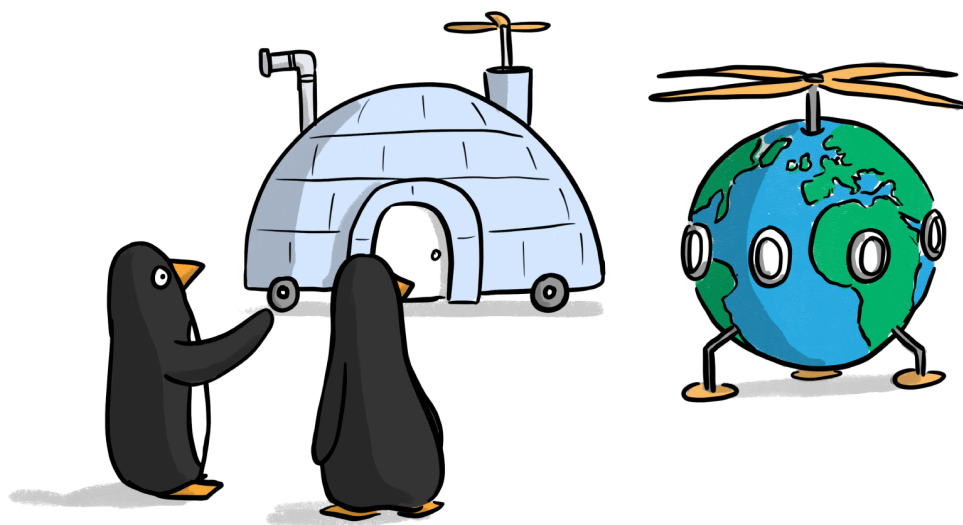
In this view, a conceptual framework is essentially designed to facilitate moving the thought processes of the researcher onto this reflective level where all the different aspects of a study are brought together. An effective conceptual framework can offer a ‘birds eye’ view on the project as a whole, how it hangs together, and what the implications of the results might be. This can be particularly important for things like writing your abstract or taking part in a viva exam where it is important to be able to concisely describe and reflect on your work and how it relates to other scholarship.

The reverse side of this coin concerns the selection of a conceptual framework. For a conceptual framework to adequately support the expression of ‘doctorateness’ in a research project it must be able to support a level of reflection which is relatively sophisticated. It needs to cover a range of considerations at the right kind of depth but not be so broad that it lacks focus.

## New and Existing Conceptual Frameworks

Educational research is often multidisciplinary and has to take into account different contexts and considerations. This may be one reason why conceptual frameworks used in this kind of research are often expansive and multiperspectival. (Here we start to introduce some additional perspectives from GO-GN members.)

If you decide to create your own framework then it’s necessary to explicate why existing frameworks were not sufficient for answering your research problem. This may be easier to justify when modifying an existing framework because it just doesn’t take account of some particular element or consideration. This process can be approached both empirically and/or through a critique of ideas and theoretical commitments. The most important thing is that the conceptual framework(s) you choose to work with need to make sense for the way you are running your project and answering your research question.



*"Conceptual frameworks are a very useful tool that you can use to guide your thinking and find important or any missing aspects that are going to play an important role in your research. I recommend that doctoral students in their early phase of Ph.D/Ed.D try to find a useful framework on their research topic to guide their thinking. If there's nothing they can find, they can also create and propose one, based on literature review." - Tomohiro Nagashima*

In practice, most new frameworks are created by combining or modifying existing frameworks to make them more relevant to the current research project. This can be an important part of developing new theoretical perspectives and angles on research.

*"In my research I used several conceptual frameworks. In the first study, I used the framework of business models as a tool to analyze organizations and the interrelationship between different types of organizations (Bazars and Cathedrals, as we called them). In the second and third studies I relied on the MOOCKnowledge framework that was presented by Kalz et al. (2015). The theoretical basis tries to cover the impact of socio-economic background variables, ICT competences, prior experiences and lifelong learning profile, variance in intentions, environmental influences, outcome expectations, learning experience, and economic return on taking and completing Massive Open Online*

*Courses (MOOCs). I extended the framework and implemented it into subjective learning outcomes such as learner satisfaction and intention fulfilment. The conceptual basis of intention fulfilment is rooted in the theory of intention-behavior gap.” - Eyal Rabin*

One question that it is important to ask yourself before you start creating a new framework from scratch is whether or not you really need to. There is an expectation that doctoral level research needs to be original, and this is a reasonable expectation. However, this does not mean that there is an obligation to reinvent the tools of research. (It's also fine to not invent any new concepts and just apply existing concepts in new ways.)

*“The UTAUT Framework and the Design Thinking approach were geared towards providing data that addressed and explored my research question. I also used Warschauer’s (2002) framework for Effective Use of ICTs to guide the coding categories of the design thinking workshops and focus group questions to assess the overall effectiveness of the OER professional development programme. The case study methodology used in this study promoted triangulation validity (of data source, data type, method and theory), which is obtained when the researcher can draw evidence from multiple datasets. Doing so is advantageous because multiple datasets provide better results than single datasets do. While the UTAUT framework only provided a small quantitative glimpse of the data collected and analyzed and there is no statistical significance for a small nonrandom population of instructors, the design thinking approach is particularly effective in the K-12 sector as it enables researchers to assess teachers’ volition and responsiveness to changing their pedagogical practices by means of OE/OER uptake. Rather than impose OE/OER adoption, it provides participants with an opportunity to learn something new, taking into consideration their needs, knowledge and local realities, thereby enabling them to identify the existing challenges and how these could be overcome if they decided to adopt Open Educational Practices and/or OER. All things considered, qualitative approaches to analyzing data from conceptual frameworks hold the potential to provide rich, thick descriptions and a higher validity to findings even though no qualitative studies are generalizable in the statistical sense. Nevertheless, their findings may be transferable. Finally, conceptual frameworks that have already been used in previous OE/OER studies may be more applicable to research in open*

*education as they might have already been either validated or could benefit from replication to be validated.” - Viviane Vladimirschi*

Another thing to consider is that your conceptual framework is likely to evolve throughout the research process; it need not be crystalised at the stage you are writing a literature review.

*“My supervisor gave me this advice after I had been struggling with my conceptual frameworks chapter for some time: The focus of your conceptual frameworks chapter should be on describing the frameworks as they are used in the literature. Don't try to reinvent them before you have used them in your data analysis. Also, if you are using two conceptual frameworks that are not usually used together in the literature, describe them separately for now. You might arrive at a new version of a framework (or a combined version of two frameworks) after you have done your data analysis.” - Gabi Witthaus*

Many research questions can be investigated quite successfully within existing theories and frameworks, and it can be easier to justify using something already validated through use. Moreover, the results of a study may be more directly comparable with other studies using the same framework. But the downside is that you may be continuing with the status-quo of thinking, and shutting off new approaches. Some research questions require bespoke and creative approaches. After all, new theorising is an important way for new knowledge to be advanced.

*“Feminist writer, author and theorist Sara Ahmed (2017) had an experience in her Ph.D of being strongly guided to use existing theory from acknowledged theorists - most often men of a certain era - as she came to know the field. She talks about the politics of citation, how you become a theorist by citing other theorists. But from her feminist perspective, theorising comes out of lived experiences (for example of why we do not fit in, of having to insert ourselves in places we should belong but are not, in fact, equally welcome.) If we don't keep generating new theory, then theory never advances. If we don't start generating new theory, it never gets to be tested across multiple contexts and used by others, which is core to what validates it as 'theory'. So I quite like this “take” on theory too - that it is in fact approachable and researchers (maybe particularly critical researchers who tend to be less happy with status quo) should roll up their sleeves and not be*

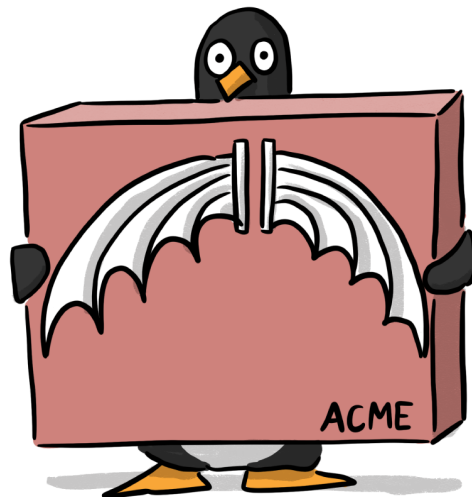
*afraid to theorise new explanations for phenomena, especially when the existing ones do not ring true or make sense, from one's ontological point of view."* - Sarah Lambert

## The Role of Openness

At this point the aspiring open education researcher might be thinking: “OK, I think I am starting to get a feel for some of the options for using conceptual frameworks, but where does openness fit into this? Is openness a conceptual framework?”

This is not necessarily an easy question to answer as openness by its nature is realised and contextualised in different ways. Furthermore, a research question might have to focus only on specific aspects of openness to make a project manageable and inform a sensible data collection strategy.

*“Warschauer’s (2002) seminal work “Technology for Social Inclusion” appeared to be a good fit with the socio-economic and cultural reality of Brazilian K-12 public schools, and suggests that providing technology for free does nothing to improve the lot of disadvantaged learners. On the contrary, it serves to further expand the digital divide between those people that have had the economic and educational opportunity to become literate with ICT skills and those who do not. This same idea could be applied to those people who have had the opportunity to learn how to read and write. In this sense, Warschauer’s (2002) work is very much aligned with Freire’s (1970) work with illiterate people aimed at promoting social inclusion. Thus, Warschauer (2002) posits that to have meaningful access and engagement with ICTs, teachers need to have literacy and literacy, in this sense, brings to the table different social, economic and cultural connotations and implications. The framework provides a sound foundation for assessing how each of these physical, digital, human and social resources are impacting the use of ICTs in an institution through their presence and accessibility or lack thereof, enabling researchers to design interventions that will promote effective and meaningful use of ICTs, ultimately promoting and driving OE/OER use as well.” - Viviane Vladimirschi*



*"I used Warschauer's framework as the basis for building a new conceptual framework that can be used to guide both the research and development of online courses that are socially inclusive. I added one more dimension to Warschauer's framework and developed a new set of definitions for each dimension to make it applicable to online courses, not just technologies in a more general (non educative) sense. And while I tested and developed the framework with reference to a number of open online courses, in my discussion and implication section I argued the framework should also work for regular university online courses where a diverse student population is the approaching normal state. This illustrates again the blurred boundaries between conceptual frameworks used with open education and with applicability to more general online education - even in the one paper!" - Sarah Lambert*

Some people focus on pedagogical aspects and use an approach that reflects this, such as the 5Rs (Wiley, 2014) or COUP framework (Bliss, Robinson, Hilton & Wiley, 2013). Others might be more interested in social justice, and so generate or use a complementary framework (Lambert, 2018). It's also possible to investigate some element of open education without much reference to openness as a concept (e.g. studying the MOOC experience where the only open element is enrollment).

*"I suppose that it depends on the analysis level that we would like to analyze. The business model framework is more appropriate for analyzing open education from the organizational perspective.*

*The MOOCKnowledge framework is applicable when analyzing OE(R) from the viewpoint of the participants and the perspective of learning analytics is more useful for understanding and optimizing learning and the environments in which it occurs.” - Eyal Rabin*

This means that there isn't really an overarching conceptual framework for openness, but there are many conceptual frameworks which either draw on openness for inspiration; or focus on particular aspects which are relevant to a given context. This lack of an orthodoxy may be intimidating, but it also reflects the flexibility and inspiration many researchers draw from the idea of openness.

*“The intra-disciplinary, intra-methodological applications of diffusion of innovations theory lends it to the study of open education.” - Kathy Essmiller*

*“In my opinion, the conceptual frameworks that suit open education are the ones that allow an interdisciplinary focus, as OERs do not fall only into the field of education or only into material design. Perhaps, they should also enable a diverse epistemological stance, so that they could be applied and tested using different (mixed) method research designs.” - Irina Rets*

*“Because open education is such a broad field, I think the conceptual framework you use just needs to be the best fit for the questions you are asking. To be a bit reductionist and binary, if the research you are doing is concerned with the lived experiences of OEP, the framework you use might be different than if it were concerned with a purely content- and data-based investigation (qualitative or quantitative). The context of the study and theoretical influences in the work you're doing need to be aligned with the conceptual framework, much like methodology. I think that open education is anchored amongst certain ways of thinking about education; that it should be democratic, agential, free, accessible, adaptable, re-usable and transformative. Given these features of the field, the theory, methods and concepts you use would need to relate to these features in some ways. Using a capitalist and profit-driven approach, or free-market-open economic concepts might be interesting but possibly antithetical to educational openness in its origins in distance education and sharing of open-source software. What does your work contribute to the field?” - Johanna Funk*



In summary: openness can be a way to bring together different areas of interest thematically. It can be a way to contextualise a research question, or it can be a focus for the research question itself. There is no one overarching sense in which openness is a conceptual framework, but it can definitely inspire or guide the choice of a conceptual framework within a piece of research.

In the next section we'll look at some ways in which GO-GN members have applied different conceptual frameworks in their open education research projects.

## Conceptual Frameworks Overview

Here we present a short description of some conceptual frameworks and how they have been used in doctoral research projects by members of GO-GN. We don't claim that this is an exhaustive list of conceptual frameworks! Rather, these are some of those being used by contemporary researchers in our network to understand aspects of open education.

These frameworks are presented here with brief descriptions; reflections by researchers who have used these approaches in their own work; and some key references (some of which are general and some specific to the project being reflected on). We also added brief descriptions of some other frameworks which are useful to know about.

### Activity Theory

*"Cultural Historical Activity Theory (CHAT), as conceptualised by Engeström (1987) studies different forms of human practices in change, with both the individual and the social levels interlinked. CHAT is a theory of object-driven activities. The object of activity is the reason why groups of individuals choose to participate in an activity; thus, the term activity addresses the relationship between the actors and their motives and concerns, and gives the activities a special direction (Kaptelinin, 2005). Cultural differences and social discontinuity give rise to inner tensions and contradictions, which are a potential for change (Engeström, 1987) and for learning at the boundary (Akkerman & Bakker, 2011). I find this conceptual framework useful in a critical analysis of open education, when trying to understand tensions and dynamics in human activities. It instructs us to treat people as sentient moral beings and emphasizes the behaviour or activities of the same people and it needs to include the motives, goals and conditions of activities in the analysis since activities are oriented towards motives. It should be emphasized that this conceptual framework has human activity as a unit of analysis, including a complex system of individuals, artefacts, traditions and interests, in contrast to proceeding from the individual (Vygotsky, 1978) or the community (Lave & Wenger, 1991)."* - Anne Algers

*"I've used Cultural-Historical Activity Theory (CHAT) of Engeström (1987). This model allows me to focus on the perspective of brokers and situate their role within a complex context of cultivating an inter-institutional community around OER. The strength of this model is that it allows you as a researcher to explore activity system(s) in detail in which the cultural and historical conventions are taken into account. Additionally, it provides a framework to emphasize on the experiences and role of (group of) individuals within an activity system. For example, it allowed me to analyze the same activity system from both the perspective of brokers as of teachers. It provides a framework to illuminate the elements of an activity system and to investigate if there are any (perceived) contradictions within the activity system, with other more advanced systems, or with neighbouring activity systems. The analysis of the activity system and the contradictions allows you as a researcher to gain a better understanding of the complex reality of open education projects and practices. If I have to state a downside is that it takes some time to really grasp CHAT." - Marjon Baas*

Key References: Akkerman & Bruining (2016); Engeström (1987; 2001); Engeström & Sannino (2010); Kaptelinin (2005)



## 'Big' and 'Little' OER

OER are often framed as those resources produced by institutions (such as the Open University's OpenLearn) or projects such as BCCampus open textbooks. However, individual educators who are engaged in open educational practice

produce a range of artefacts also. Weller (2010) distinguished these as Big and Little OER, with distinct properties for each.

*“Weller (2010) divided OER into two categories that are helpful for my work, big OER and little OER. He described big OER as “institutionally generated ones.” He further explained that “these are usually of high quality, contain explicit teaching aims, are presented in a uniform style and form part of a time-limited, focused project with portal and associated research and data” (n.p.). Funding of these big OER has historically been heavily funded by foundations, in particular the Hewlett Foundation. Big OER have typically focused on the large-scale transmission of open content as exemplified by partnerships between academic institutions with UNESCO and governments around the world to apply open licenses to publicly funded educational content (Cronin, 2017).*

*“In contrast, little OER might consist, for example, of a single image instead of an entire course. They also tend to be created and shared by individuals at low cost. Weller (2010) noted that the “low production quality of little OERs has the effect of encouraging further participation... they are an invitation to participate precisely because of their low quality” (n. p.). In so doing, he highlighted an important relationship: the relationship between scale and pedagogy.*

*“Some years earlier, Schramm (1977) categorized educational technologies as “big media” and “little media” as a means to distinguish high-cost, large audience from low-cost, small-audience media. Building on these ideas, Anderson and Garrison (1999) differentiated what they called “big distance education” and “little distance education.” I blended Weller’s (2010) Big and Little OER, with Anderson and Garrison’s (1999) big and little distance education and Franklin’s (1999) prescriptive and holistic technologies to develop a conceptual framework for big and little open education.*

*“A simple conceptual framework of big and little open education served as a helpful research tool, a simple structure for organizing scale-related ideas and guiding me in the development of my research methods. Scale within contemporary open education is, however, not a simple matter, so I used big-little open education*

*as a simple starting point, a binary to trouble and complicate throughout the remainder of my research study.” - Tanya Elias*

Key References: Cronin (2017); Garrison & Anderson (1999); Schramm (1977); Weller (2010)

## Boundaries

One challenge of interdisciplinary research is bringing together different areas of academic specialisation. Continuities between different knowledge communities have been explored through the idea of ‘boundaries’. “A boundary can be seen as a sociocultural difference leading to discontinuity in action or interaction. Boundaries simultaneously suggest a sameness and continuity in the sense that within discontinuity two or more sites are relevant to one another in a particular way.” (Akkerman & Bruining, 2011:133) This concept has been used to describe the relationship between transitional states, pedagogical approaches and learning processes.

This idea of boundaries informs two distinct but related concepts:

- *Boundary Objects* are artifacts (material, digital, technological, informatic, procedural, etc. ) that are shared by several knowledge communities and so represent a point of convergence between them (even if they are interpreted differently). Such objects can be a focus for understanding different perspectives.
- *Boundary Crossing* represents the attempt to overcome boundaries between practice communities and establish some shared perspective and co-ordination of activity.

One central idea here is that boundaries represent learning opportunities for the communities defined by them. Another is that boundaries can act as a dialogic focus for different groups. In educational research these concepts are often used to explore inclusivity and exclusivity in knowledge communities and ways that learning and pedagogy facilitates the transitions across boundaries.

*“The aim of my research was to explore ways of organising and supporting open education in the controversial subject area of industrial farming, use of animals for food and sustainable food*

*production. The aim was both analytical - to understand boundary activities in these domains - and design oriented - to develop models and methods for working with and enhancing open educational practices. The theoretical approach was cultural historical activity theory (CHAT), and more specifically, theories on boundary activities and learning at the boundary between activity systems, or between groups of individuals with different views in society. I have used the concepts of boundary activities, boundary objects and learning at the boundary for my thesis. These concepts are useful when focusing on controversial issues and in particular when the equality of vulnerable sentient beings is at stake. This could be exemplified with the recognition and representation of the subaltern (Spivak, 2003), such as children, ethnic minority groups, people with functional impairment, and in this case of industrial farmed animals. In these situations, different perspectives have to be spelled out and the subaltern should be heard, listened to and empowered within these negotiations.” - Anne Algers*

*“In one study I examined the role of brokers to cultivate an inter-institutional community around OER. Brokers is a term often used to describe coordinators that have the necessary structural position to act as a bridge between otherwise separate groups (Akkerman & Bruining, 2011). In this study brokers had the role to expand the user group of an inter-institutional community so that sustainable collaboration would be realized. Their role was to cross boundaries to facilitate access to resources, facilitate knowledge transfer and coordinate actions. By applying cultural-historical activity theory (CHAT), we were able to gain more specific insights into their boundary spanning behaviour as well as to gain insights into the perceived contradictions they experienced in their role as broker. The concepts of boundary spanning, boundary crossing and boundary objects can be really useful to explore inter-institutional collaborations or individuals that have to cross boundaries between sites.” - Marjon Baas*

Key references: Akkerman & Bruining (2011; 2016); Kaptelinin (2005); Star & Griesemer (1989)

## Capability

*“The capability approach asks to what extent individuals are able to do and be the things that they value doing and being in life. In a higher education context with a widening participation vision, the capability approach shifts the focus from simply asking whether disadvantaged groups have access to university, to asking whether individuals have the capabilities to convert such access into valuable outcomes for their lives. The main advantage of the capability approach is its essential focus on social justice. It also provides a language for talking about equity (in terms of capability sets, valued functionings, and conversion factors); another advantage is that the approach is relatively mature, having first been put forward by Sen in the late 70s and subsequently elaborated on and critiqued by several other scholars. One disadvantage is perhaps that these terms are unfamiliar to most people, at least with the specific meanings they carry within the capability approach. However, I think the conceptual clarity added by these terms, once defined, outweighs this minor disadvantage. While its heritage is cross-disciplinary, initially having been located within economics and philosophy, it is also accumulating a significant body of literature in higher education research - dominated by a group of scholars from the University of the Free State, South Africa led by Melanie Walker, but also including works from Australia, the UK and elsewhere. For an excellent overview of the Capability Approach, Robeyns (2017) has produced a highly readable, comprehensive overview of the framework under a CC-BY licence. As part of my open thesis, I have written a series of blog posts on the capability approach in higher education and collated these into a single document as an OER (Witthaus, 2022).” - Gabi Witthaus*

Key References: Nussbaum (2011); Robeyns (2017); Sen (1999), Walker (2008); Walker & Wilson-Strydom (2017)

## Cathedral/Bazaar

The distinction between ‘Cathedral’ and ‘Bazaar’ comes from an essay on the difference between different kinds of software design (Raymond, 1999). In the Cathedral approach software is developed by an exclusive group and released only

when ready; while in the Bazaar model development takes place transparently and openly giving many people opportunities to test and improve it. The essay was influenced by the development of internet protocols and working practices as well as software development. In an open education context the metaphor is sometimes transplanted onto alternative models for producing or sharing educational resources. This can cover a wide range of pedagogical, organisational or business considerations.

*"The aim of my dissertation was to answer the central research question: How to evaluate learner-centered outcomes and their antecedents in open online education? To address this question, two learner-centered outcomes, namely, learner satisfaction and learner intention-fulfillments were identified as alternative course outcome measures. Five studies were conducted in order to define the theoretical problem and empirically revealed some of the answers. The first study presents a comparative analysis between the business models of traditional HEI and open education. The analysis investigates the impact of digital innovation on the business models of higher education institutions using Raymond's (1999) well-known "Cathedral and Bazaar" metaphor on software engineering methods. The changes promoted by the "bazaar" facilitate the adoption of MOOCs by the mainstream "cathedral", but require, at the same time, the development of new learner-centered outcome measures, which are appropriate for emerging educational ecosystems." - Eyal Rabin*

Key References: Farrow (2016); Rabin, Kalman & Kalz (2019a); Raymond (1999)



## Community

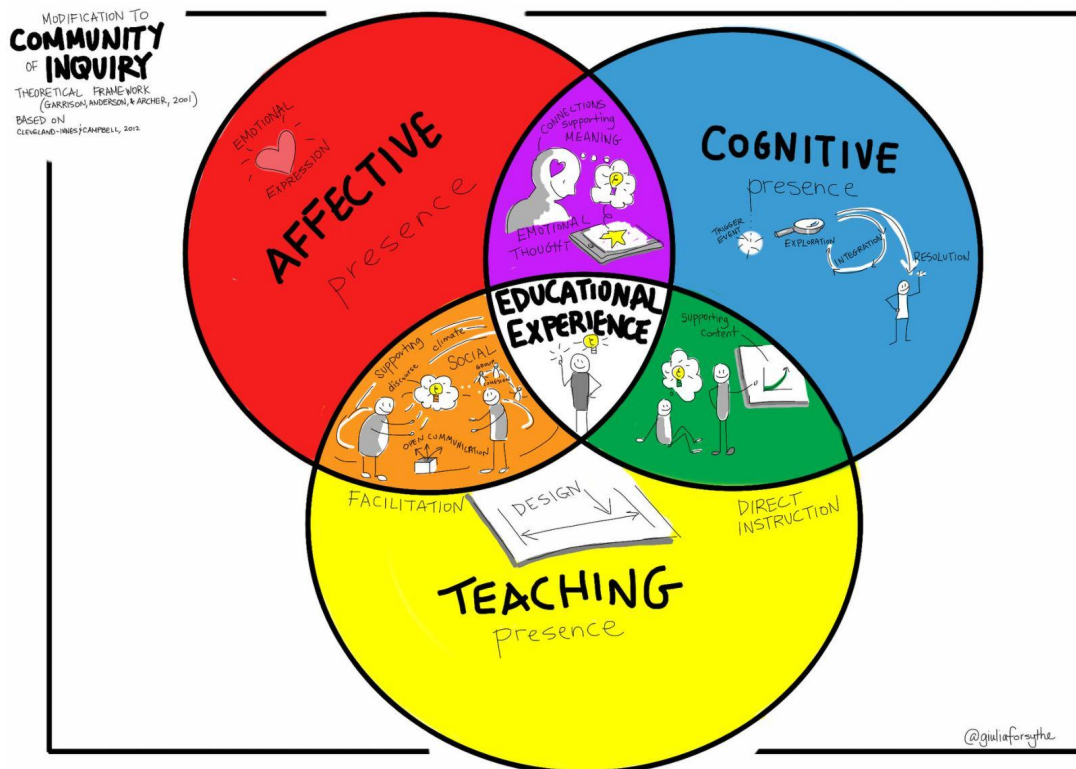
As learning increasingly happens in online communities researchers have looked for ways to theorise the role of community and group dynamics in learning. A 'community of inquiry' is a conceptual model proposed for understanding how educational experiences arise from the interplay of individual and group dynamics. This process is understood through the interaction of three core elements: cognitive presence, social presence, and teaching presence. By incorporating a range of evidence and indicators relating to these categories the researcher can build up a picture of how a particular community orients itself towards the process of inquiry.

Elements	Categories	Indicators (examples)
Cognitive Presence	Triggering Event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
Social Presence	Affective Expression Open Communication Group Cohesion	Emoticons Risk-free expression Encourage collaboration
Teaching Presence	Design & Organisation Facilitating Discourse Direct Instruction	Setting curriculum & methods Sharing personal meaning Focusing discussion

Community of Inquiry Coding Template (Garrison, Anderson and Archer, 2000)

The interest in presence in this approach has been applied to examples of text-based and computer mediated communication to understand how distributed communities can effectively operate as communities of inquiry. This has been applied to many instances of online and blended learning.

These categories are flexible enough to have been applied in many different contexts, and have also been adapted to suit new purposes, as the following graphic illustrates.



*Modified Community of Inquiry based on Garrison, Anderson & Archer (2001)  
(Giulia Forsythe, Public Domain)*

Another influential conceptual approach is 'communities of practice'. Where communities of inquiry are typically applied in circumstances like higher education where there is an explicit knowledge creation or knowledge transmission aspect, communities of practice are composed of people who share an interest, passion or concern for a particular activity. Communities of practice may be co-located (e.g. in a workplace) but can also be distanced. They are composed of three elements: a domain or network; members of the community who belong to it; and the practices they share.

Key References: Garrison, Anderson & Archer (2000); Garrison, Anderson & Archer (2001); Rovai (2002); Wenger, Trayner & de Laat (2011) Wenger, McDermott & Snyder (2002)

## Connectivism

Connectivism is a learning theory that was developed to accommodate the manner in which learning occurred in online networked spaces. Connectivism was influential in the early MOOC development. With the advent of greater connectivity, user generated content and social media, a number of educators began to explore the possibilities of education in a more networked, connected model that was more “internet native” than existing learning theories. The theory of connectivism was proposed by George Siemens and Stephen Downes in 2004-2005. Siemens (2005) defined connectivism as ‘the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements—not entirely under the control of the individual’.

Siemens (*ibid.*) stresses Connectivism is not a pedagogy, but rather it could be viewed as a set of principles:

- Learning and knowledge rests in the diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources
- Learning may reside in non-human appliances
- Capacity to know more is more critical than what is currently known
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Key to the connectivism approach is the belief that knowledge is distributed in a network, and learning is a chaotic process. There is no single, correct set of knowledge and education occurs with the transferral of this from educator to learner but rather knowledge and people are distributed, and it is the process of engagement with these that constitutes learning.

*"I used (1) connectivism, (2) rhizomatic learning, and (3) network theory. My advantage was connecting my findings to the related literature through the lens of these theories/conceptual frameworks. Besides, these lenses helped me to build upon my findings on a solid base. In my dissertation, I didn't see any disadvantage, but I sometimes feel that these theories may limit our ability to further ponder on our findings because we generally stick to principles, rules etc. identified by these lenses." - Aras Bozkurt*

Key References: Siemens (2005; 2006); Kop (2011)

## COUP Framework

The Open Education Group's COUP framework (Bliss, Robinson, Hilton & Wiley, 2013) supports research into the potential impact of open practices and OER. It focuses on four broad facets which "...comprise the salient aspects of education that we consider most likely to be impacted by the use of OER" (*ibid*). These are:

- Cost
- Outcomes
- Usage
- Perceptions

The COUP framework has been used in a variety of ways, from explicitly helping structure research into students and educator use of OER (see e.g. Project Kaleidoscope (Contact North/Contact Nord, 2018) and the Open Education Group's own Research Fellows) to categorising literature on the impact of OER (see e.g. Hendricks, 2016 and Clinton, 2018). Perhaps one of its great advantages is to co-ordinate and focus the data collection activities of so many researchers to build up a comprehensive account of the impact of OER adoption.

*"The Open Education Group's COUP Framework has proven most helpful to my efforts." - Elizabeth Spica*

Key references: Bliss *et al.* (2013); Clinton (2018); Hendricks (2016); Open Education Group (n.d.)

## Design Thinking

*"The Design Thinking Framework was used for delivering workshops (the intervention) during teachers' education activity time during the ODP (OER Development Program). Although Design Thinking is not a framework per se, the Design Thinking for Educators toolbox contains a structured approach geared towards enabling collaborative activities in the classroom by fostering higher-order thinking and creative skills (Razzouk & Shute, 2012) to solve a specific problem. This approach is particularly useful for enabling "high-impact solutions to bubble up from below rather than being imposed from the top" (Brown & Wyatt, 2010, p. 32). The design thinking approach not only enables researchers to gain more insight into potential solutions for introducing new professional practices, but also affords teachers multiple opportunities to participate in the process of determining how innovation may be best implemented. Because the design thinking approach is human-centered, collaborative, experimental and inherently optimistic, several K-12 schools have been using it to tackle challenges related to the design and development of the curriculum, and to effect changes in the spaces of learning environments, in processes and tools and in schools' goals and policies (Design Thinking for Educators, 2013). The distinguishing feature of design thinking as an approach for transforming difficult challenges into opportunities in a K-12 educational system is how it affords educators the ability to experiment with new ways of doing things and to learn by doing in the process (Design Thinking for Educators, 2013).*

*"Some advantages to using this approach are its structured approach and flexible process; its ability to raise awareness actively and collaboratively; its ability to enable teachers to identify their own assumptions, generate potential solutions, reflect on what was learned and refine their ideas in light of the challenges that were brought up. However, to produce good results, this approach needs to be embraced by the entire organization, which was not the case in this study, as the school administrators did not participate in the workshops." - Viviane Vladimirschi*

Key References: Brown & Wyatt (2010); Design Thinking for Educators (2013); Razzouk & Shute (2012)

## Diffusion of Innovations

*"I designed and implemented my dissertation research project using diffusion of innovations theory (Rogers, 2003). Diffusion of innovations theory facilitates the systematic study of the adoption and diffusion of innovations and provides a lens through which researchers can make meaning of the innovation diffusion process through which ideas are socially communicated over time (Rogers, 2003). The theory defines an innovation as an idea or practice perceived as new. Users may choose to adopt an innovation after having knowledge of the innovation and being persuaded of its value. Diffusion is the "social change" (Rogers, 2003:6) which takes place as those within the social system communicate information about the innovation. The theory has its roots (!) in a study of the diffusion of hybrid seed corn use by Iowa farmers (Rogers, 2003; Ryan & Gross, 1943). It has been used to frame research in the fields of anthropology, sociology, education, public health, communication, marketing and management, and geography, among others.*

*"Diffusion of innovations theory can be used to make meaning of innovation development and innovation decision processes. The innovation development process is a nonlinear process through which individuals or organizations recognize and determine to address a problem or need. The innovation decision process details five stages through which individuals or organizations pass through when considering adoption of an innovation. The five stages of the innovation-decision process are knowledge, persuasion, decision, implementation, and confirmation. Individuals move through the innovation decision process in order to evaluate and eliminate uncertainty associated with adoption of the innovation.*

*"Individuals' perception of the attributes of the innovation play a role in the rate and speed of the innovation's adoption and diffusion. Rogers (2003) presents five attributes as impactful in the diffusion process. Those five attributes are relative advantage, compatibility, complexity, trialability and observability.*

*"One of the advantages of using diffusion of innovations theory to design and implement research projects is that it has been used over time across a number of disciplines. For instance, my January 2020 search of the ProQuest database using key terms specific to libraries and diffusion of innovations theory returned 38 results, suggesting the theory is in use for research related to library science. The theory is applicable to both the individual and organizational innovation-decision process, and is appropriate for projects asking questions such as why and how as well as those seeking understanding of the consequences of the adoption and diffusion of innovations.*

*"Examples of the use of diffusion of innovations theory can be found in quantitative, qualitative, and mixed methods research designs. This could be seen as disadvantageous for scholars seeking a framework aligned with a singular methodological tradition."* - Kathy Essmiller

Key References: Baker & Ippoliti (2019); Hodgkinson-Williams & Paskevicius (2012); Jhangiani (2017); Rogers (2003)



## Equity

*“My nonexperimental, multi-part dissertation explored issues of course material affordability for students at Tennessee community colleges. Guided by Bensimon’s conceptual framework on equity in higher education (Bensimon, 2005, 2012), data in each study were disaggregated to examine potential inequities regarding three populations of concern for Tennessee higher education (non-white, low-income, and learners over age 25). Data were drawn from two sources: a student survey (n = 1,912) and three years of anonymized course outcome data. While this dissertation focused on textbook affordability in general, an equity framework is equally applicable for OER.*

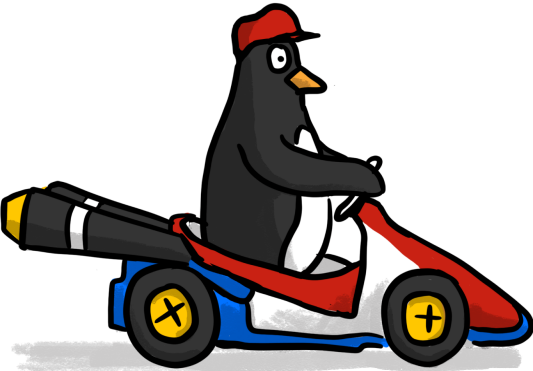
*Bensimon’s focus on equity-mindedness proved useful in framing my three studies for the following reasons:*

1. *Bensimon underscores that inequities are an institutional problem, a failure of practice, whether that failure lies with policies, practices, or even the structural or cultural arrangement of an institution.*
2. *“Equity-mindedness” focuses on actions under OUR control, rather than trying to figure out how to fix problems or shortcomings we (consciously or not) believe to be inherent to the student; and finally,*
3. *Bensimon focus on the use of disaggregated data directly guided my method (hierarchical linear mixed modeling approach) and analysis (disaggregated by populations of concern). As Bensimon relates, by first gathering and analyzing data, we can help others resist the natural urge to feel a problem is already understood.*

*Insight from these findings has proven helpful for both educators and policymakers to catalyze and frame conversations around the role of institutional policies and practices in creating, perpetuating, and resolving issues related to course material costs.” - Elizabeth Spica*

Key References: Bensimon (2005); Bensimon (2012); Bensimon, Dowd & Witham (2016)





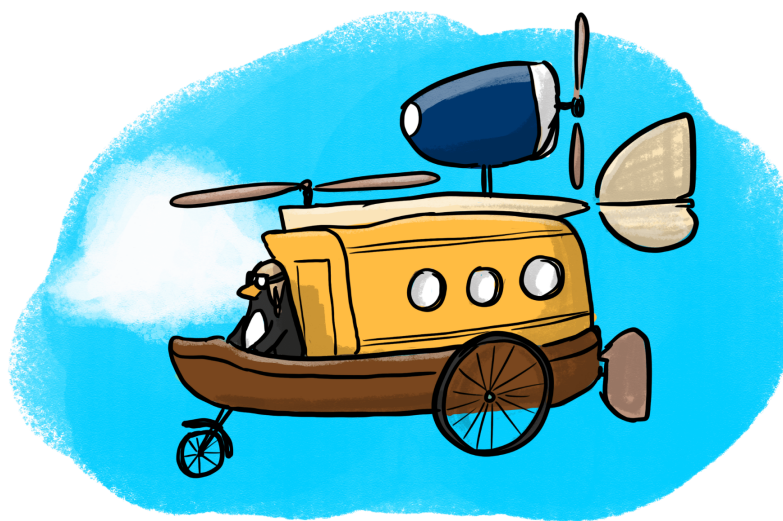
## Learning Analytics

Learning analytics may be considered more of a methodology than a conceptual framework. It is concerned with the analysis of data generated by learners to reveal patterns of behaviour. However, like citation analysis it can also be considered an approach to a conceptual framework in that the researcher is less concerned with accommodating the results within an existing framework, and more interested in the emergent properties of data analysis.

*"Clow (2012) proposes a learning analytics cycle, which has learners producing data, which undergoes analysis (for example producing metrics in dashboards), which in turn leads to some form of intervention. For analytics to be effective, intervention is required that has some effect on the behaviour of learners.*

*"Overall, I used Learning analytics as a conceptual framework defined as "the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (Siemens et al., 2011)." - Eyal Rabin*

Key References: Rabin, Kalman & Kalz (2019b); Siemens & Baker (2011)



## Linguistic Accessibility

*“Most open courses, such as OERs, are created in English, while the OER audience consists of many non-native English speakers, who report experiencing a language barrier when learning from the OERs (e.g., Cobo, 2013; Rets et al., 2023). As a number of studies showed that one size does not fit all, particularly in online education, which gives immense opportunities for a personalised learning (e.g., Rets, Rienties & Lewis, 2020; Rets & Rogaten, 2021), I saw a need to explore OER accessibility, and more specifically - the accessibility of these resources in English to non-native English speakers. Furthermore, OER research lacks studies that use observational data, or studies that conceptualise and evaluate solutions on how to improve the accessibility of OERs, which can be generalised to an international learning context.*

*“The framework that was generated in my thesis to investigate this problem was linguistic accessibility. I used it for the analysis of the language level of OERs, and the evaluation of text simplification (reducing the language level of the learning material to make it easier) as a potential solution to the language barrier, discussed above. This framework enabled me to address the following major gaps in OER research: the level of text complexity of OER course materials and its variability across educational levels and subjects; approaches that experts, such as English teachers, take to simplify OERs; and the effectiveness of simplification as a solution to make OERs more accessible to non-native English speakers. These gaps were investigated through a mixed methods research design in four empirical studies using multiple data sources: reading materials from 200 OER courses, 24 English teachers, and 46 non-native English speakers.*

*“It was clear from the beginning that the problem is complex and needs to be addressed from multiple perspectives. The use of any learning material and not just OERs involves many stakeholders. The way I operationalised linguistic accessibility was by approaching it from three perspectives: (1) text complexity (material-centric view, how complex is a given learning material?); (2) task difficulty (teacher-focused view, what pedagogical techniques and approaches are used to facilitate learners’*

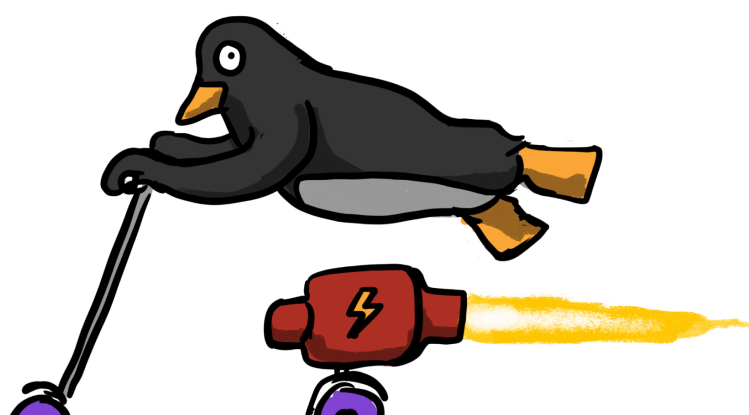
*successful understanding of materials?); and (3) text difficulty (learner-focused view, how well a learner understands a given material?).*

*“After the four-year journey of working on linguistic accessibility, I see several advantages of this conceptual framework:*

- *It enables one to obtain a more in-depth and well-rounded understanding of accessibility of OERs in English, how it can be achieved, and how it can help those who struggle with the language barrier when using OERs.*
- *The three perspectives it is based on are closely linked with one another. Analysis of text complexity can help estimate the difficulty of the text and identify the need for the work on task difficulty to be carried out. The efficiency of the task difficulty work can further be evaluated through the analysis of text difficulty.*
- *It enables a shift from framing OER accessibility as a deficit, where any shortcomings are situated within the learner, to framing accessibility of OERs as part of a societal issue or university approach to accessible learning.*
- *This framework allows an interdisciplinary focus.*

*“The disadvantage of this framework is that while it provides a big picture, the analysis would be more in-depth if I focused only on one of its perspectives (text complexity, task difficulty, text difficulty). I am sure there could be a separate thesis on each of those.” - Irina Rets*

Key References: Amendum, Conradi & Hiebert (2018); Cobo (2013); Jatowt & Tanaka (2012); Rets & Rogaten (2021); Rets et al. (2023)



## MOOC Accessibility

*“MOOCs can provide learners with the flexibility to learn, opportunities for social learning, and the chance to gain new skills and knowledge. While MOOCs have the potential to also bring these benefits to learners with accessibility needs, there is little understanding of how accessibility is embedded in the design and implementation of MOOCs. The aim of my research has been to understand the accessibility barriers in MOOCs and to develop processes to identify and address those barriers. Learners with accessibility needs face difficulties in interacting with MOOCs, and certain learning designs of MOOCs may affect their engagement, causing them to miss out on opportunities offered by MOOCs. Technologies and the learning design approaches for MOOCs need to be designed accessible, so that learners can use MOOCs in a range of contexts, including via assistive technologies.*

*“An accessibility audit framework was developed to understand how to improve the accessibility in MOOCs from an expert evaluation conceptual perspective, comprising four main evaluation components used to build four different checklists in a common heuristic evaluation framework (structured in principles, guidelines and checklists):*

- *Technical accessibility evaluation. Checking of conformance to guidelines or standards through Web Content Accessibility Guidelines (WCAG) and the text-based files. The use of WCAG is a standardised and commonly used instrument for accessibility evaluation in MOOCs.*
- *User experience (UX) evaluation. The evaluation of usability and user experience characteristics of the user interface design and pedagogical design. UX evaluation takes the approach of usability inspections following cognitive walkthroughs that include two separate activities: the use of personas and scenarios. A set of engaging personas was developed. Engaging personas take a realistic description of people to draw evaluators into the lives of the personas, and so avoid stereotypical stories that focus only on*

*behaviours rather than considering the whole person.*

- *Quality evaluation. Evaluation of MOOCs properties, the quality of the design, platform and support for learners. Quality evaluation was adapted from the OpenupEd quality label.*
- *Learning design evaluation. Evaluation of the learning design characteristics within MOOCs using Universal Design for Learning (UDL). Universal design considers how to meet the needs of all learners through design.*

*“Taken together, these four components acted as a conceptual framework for my research but one anchored in gathering and triangulating practically useful data.” - Francisco Iniesto*

Key References: Coughlan *et al.* (2016); Iniesto (2020); Kear *et al.* (2016); Meyer *et al.* (2014); Vyt & Mellar (2016)

## MOOC Learner-Centred Outcomes

*“My second study introduced two learner-centered outcomes for non-formal lifelong learning frameworks such as MOOCs, namely: learner satisfaction and learner intention-fulfillment. The study empirically defines them and reveals their predictors in a MOOC. The effects of socio-demographic characteristics and psycho-pedagogical characteristics on the barriers to satisfaction among MOOC participants are discussed in the third study. Identifying these barriers to satisfaction and predicting them provides additional insight into the nature of learner satisfaction as a learning outcome.*

*“The fourth and the fifth studies, extend previous studies that have shown that clustering participants based on their learning trajectories is more informative and has a higher potential for pedagogical improvement, compared to clustering participants based on static-counting of behavioral data (Kizilcec *et al.*, 2013).*

*“The studies presented in this dissertation have, individually and all together, turned a spotlight on the importance of looking at*

*learner-centered outcomes and suggest a novel perspective to analyze learner-centered outcomes and success in open distance education forms, such as MOOCs.” - Eyal Rabin*

Key references: Kizilcec *et al.* (2013); Rabin, Kalman & Kalz (2019b).

## MOOC Knowledge Framework

Kalz *et al.* (2015) define the MOOCKnowledge framework as a combination of a reasoned action approach and self-determination theory. These frameworks offer a basis for the prediction of human social behavior and consist of background factors (e.g socioeconomic status) that affect different variables and directly influence the behavioural intention to take and complete a MOOC. The framework defines four different variables: digital variables, proximal variables, intention-behaviour gap and outcomes variables.

*“I relied on the MOOCKnowledge framework that was presented by Kalz et al. (2015). The theoretical basis tries to cover the impact of socio-economic background variables, ICT competences, prior experiences and lifelong learning profile, variance in intentions, environmental influences, outcome expectations, learning experience, and economic return on taking and completing Massive Open Online Courses (MOOCs). I extended the framework and implemented it into subjective learning outcomes such as learner satisfaction and intention fulfilment. The conceptual basis of intention fulfilment is rooted in the theory of intention-behavior gap.” - Eyal Rabin*

Key References: Kalz *et al.* (2015); Rabin, Kalman & Kalz (2019b).

## Network Theory

Network Theory seeks to understand the properties of networks and the parts of which they are comprised (such as nodes, connections, information flow, interconnectivity, performance, mechanisms of action, etc.). This has been applied in a range of fields, including the physical sciences, economics, ecology and sociology.

In an open education context, the most common form of applied Network Theory is in Social Network Analysis; this uses a range of data points - sometimes metrics from social media - to describe relevant social structures .

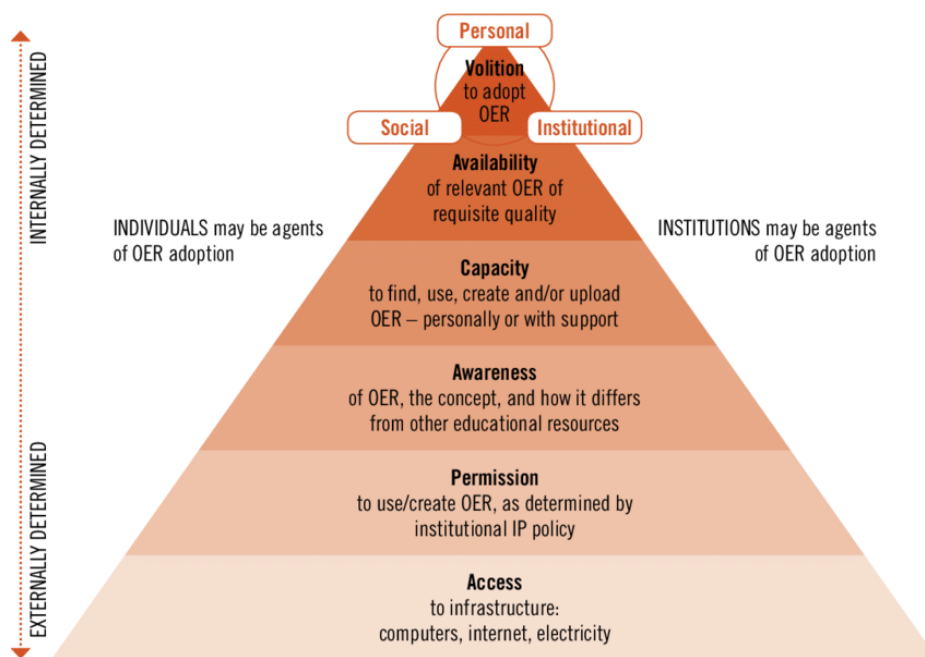
Key References: Borgatti & Halgin (2011); Borgatti, S. P., & Lopez-Kidwell (2011); Castells (2001); Jin, Girvan & Newman (2001)

## OER Adoption

One particular form of impact that is of interest to many researchers is tracking the rate at which OER are taken up as part of the core texts used in educational institutions. In addition to tracking numbers, researchers are often interested in the underlying factors that drive OER adoption. Thus, OER adoption may be understood both quantitatively or qualitatively. There is often interest in trying to understand drivers at different levels or perspectives (policy, technology, teaching and learning, etc.)

*"I made use of the OER Adoption Pyramid by Cox and Trotter (2017). This was a very useful framework, because it presents the essential OER adoption factors divided across six categories. These categories are layered based upon the level of control that an individual has over it. It provided a great analytical tool to explore which factors play a role in the current OER adoption. The strength of this model is that it is based on an extensive literature review. It's worth noting that the Adoption Pyramid is not a universal model, as recognized and underlined by the authors. It provides a great framework to analyze which layers are accounted for, and what is still needed to foster OER adoption within your context. In the findings of my own study for example, we found that the perceived availability turned out to be more near the bottom of the Pyramid as opposed to the model of Cox and Trotter." - Marjon Baas*





OER Adoption Pyramid (Cox & Trotter, 2017)

Key References: Belikov (2016); Cox & Trotter (2017); Wenger, Trayner & de Laat (2011)

## OER Impact

One common area of interest is describing and evaluating the impact of different forms of open education such as open textbooks or MOOCs. For understanding impact at scale the Open Education Research Hub used a hypothesis based approach which collected evidence for and against different kinds of impact (de los Arcos et al., 2014). The COUP Framework (Open Education Group, n.d.) has been used to compare outcomes across many higher education institutions by collecting data against several key metrics.

However, there is no single way to understand the complex patterns of impact associated with open education. This is even more the case with highly contextual pieces of research such as case studies.

*“My doctoral work is guided by the following research question: According to open educators, what impacts might large- and small-scale elements have on learning conditions and practices within open education? It is guided by Clarke’s (2018) situational analysis methodology, which is informed by postmodernism (Deleuze and Guattari, 1985; Foucault, 1982). My work is qualitative, critical and tentative in its approach. (In a previous*

*version of my dissertation, I had used Foucault's four technologies: production, sign systems, power and self. I still think that this is a good conceptual framework from which to explore open education.)*

*"I sought out participants with an interest in engaging in deeper thinking with respect to the role of scale with the current "situation of open education," using a three-stage approach to data-gathering and analysis.*

*In the first stage, I extended an open invitation to participate in an anonymous online qualitative survey and received responses from 20 open educators. I then used the results of the survey to develop an initial "messy map" specifying "all the major elements in the situation under study, broadly conceived" (Clarke, 2018:214).*

*"In the second phase, I invited a group of participants to asynchronously review, identify relationships and annotate the initial messy map, thereby generating a "relational map." In the third phase, the six annotators participated in two focus groups to further explore the ideas generated in the mapping activity. Through this process, I did not "seek solutions" or "achieve consensus." Instead, my participants continued to further complicate my research questions in ways that generated diverse ideas, questions and ways of thinking about the implications of scale within the field of open education." - Tanya Elias*

Key References: Clarke (2005); Clarke (2018); de los Arcos et al. (2014); Deleuze & Guattari (1985); Foucault 1982); Open Education Group (n.d.)

## OER Reuse

Another focus on patterns of impact concentrates on how openly licensed resources are used/reused after their initial publication. These patterns can be complex, especially when resources are remixed, adapted or combined in new ways. This kind of plasticity in educational resources is one of the innovative strengths of OER, but by its nature it is often happening in ways that are hard to document.

*"David Wiley's Reusability Paradox (and more recent Remix Hypothesis) is not called a "framework" but it does a great job guiding how we should conceptually approach OER use and remix. I have used this approach to identifying the importance of customization when integrating OER into pedagogical practices."*

- Tomohiro Nagashima

Key References: Clements & Pawlowski (2012); Wiley (2015)

## Online Collaborative Learning

Defined by Harasim (2012), online collaborative learning theory is a form of constructivist teaching that takes the form of instructor-led group learning online. In Online collaborative learning students are encouraged to collaboratively solve problems through discourse instead of memorising correct answers. The teacher plays a crucial role as a facilitator as well as a member of the knowledge community under study. Online collaborative learning includes three phases of knowledge construction through discourse in a group:

1. **Idea generating.** The brainstorming phase, where divergent thoughts are gathered
2. **Idea organizing.** The phase where ideas are compared, analyzed and categorized through discussion and argument
3. **Intellectual convergence.** The phase where intellectual synthesis and consensus occurs, including agreeing to disagree, usually through an assignment, essay, or other joint piece of work.

The end result is learning which manifests in applied knowledge through applications in the real world, although a learner is never truly finished generating, organising, and synthesising ideas, and continues those processes at progressively deeper levels. The teacher is critical to this knowledge construction, not only through facilitating the process and providing resources to the group, but also through ensuring that the core concepts and practices of the subject domain are fully integrated. The teacher is here understood to be a representative of the knowledge community or subject domain under study.

Key References: Harasim (2012); Rovai (2002); Wenger (1998)

## Online Engagement Framework

*"I am using the Online Engagement Framework by Redmond, Heffernan et al. (2018) to analyse the engagement patterns of refugees and asylum seekers in online higher education. This framework contains five distinct categories of engagement, making it easy to apply to the analysis of qualitative data. Because the framework is based on a review of literature on online student engagement in higher education, it reflects many of the current topics and debates in the literature, such as the impact on student experience of emotional and social factors. The main limitation of the framework is that it does not provide explicit guidance for investigating student agency, or for considering how structural arrangements and power relations might affect students' engagement in their online learning. For this reason, I am also using Sen's (1999) capability approach in my data analysis. The paper introducing the Online Engagement Framework (Redmond, Heffernan et al., 2018) is published in the open-access journal, OLJ, under a CC-BY licence. The paper is cited in a systematic literature review by Seery, Barreda, Hein & Hiller (2021) on retention strategies for online students, which is also open-access. These open-access resources encourage the widespread adoption of the conceptual frameworks, enabling other scholars to develop them further or adapt them to different contexts, and to share the resulting works back to the Commons." - Gabi Witthaus*

Key References: Redmond, Heffernan et al. (2018); Redmond, Foote et al. (2021); Seery et al. (2021)

## Open Educational Practices

Open Educational Practices (OEP) is a term used to describe a wide range of practices and behaviours associated with aspects of open education. At one level this might pertain to the ways OERs are used in pedagogy. But often a broad perspective is chosen so as to account for the various changes in practice that are associated with openness, or the way that differences in context are expressed. OEP don't really have a universal, objective definition (Cronin & Maclaren, 2018). However, the concept is often usefully employed to capture important changes in practices, values, cultures or pedagogy.

*"My Ph.D study examined four sets of online resources in multidisciplinary contexts and how they performed as open education practices (OEP). Because learners are the focus of my open practice, the study interrogated the different knowledge practices the resources encourage and how they count towards defining a functionally successful 'openness' to learners' knowledge background. I was working with an Indigenous social policy and workforce development suite of projects for the Northern Institute at Charles Darwin University, Australia. I focused on the resources we were making with knowledge authorities, and explored ways institutions can better value Indigenous knowledges via OEP.*

*"I examined how the resources met three sets of criteria to understand how they acknowledged and represented knowledges. These sets of criteria helped form an iterative 'filter' cycle for evaluating the resources and their OEP via my research aims: refining definitions; testing the concept of 'open' in each resource; interrogating practices to develop an understanding of how 'open' translates into functional engagement for some learners; and determining a set of practice principles for OEP and critical openness.*

*"My study evaluated practices-as-data contained in the case study resources. I used my theoretical framework and methodological philosophy based on a traditional water and filtering story (shared by my supervisor, Dr Kathy Guthadjaka) to inform the conceptual framework and analytical tool for the case studies. The conceptual framework is also strongly influenced by the context and the cultural significance of this work. There were three conceptual 'regions' I saw converging in my study:*

- 1. Online and digitally based knowledge and learning work*
- 2. Indigenous ways of learning and knowledge authority*
- 3. Workforce development and education policy and practice*

*"Each of the case studies lived at the interface between these three regions and their 'dialects.' Therefore, I needed to use conceptual language which could encapsulate the resources from these three angles. Conceptualising OEP from these three*

*perspectives helped to create a particular focus that was situation specific and appropriate, and respectful to the decolonising contribution I was hoping to make to Indigenous Knowledge work in education, workforce development and Open Education. I also wanted to couch the study in contemporary educational frameworks to maintain its academic transferability for use in institutional settings.*

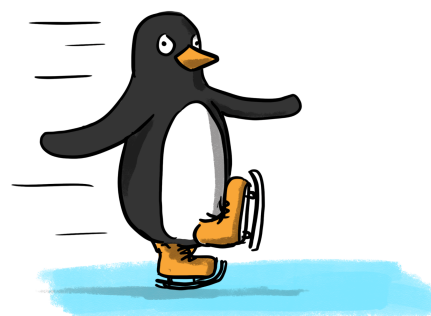
*"The advantage was I could curate something especially for my study. The challenge was overcoming the need for more certainty and a 'purpose made' framework, and taking the leap into the swamp." - Johanna Funk*

Key References: Country et al. (2015); Christie & Verran (2013); Cronin (2017); Cronin & Maclaren (2018); Martin & Mirraboopa (2003); Patton (2006); Smith (2005)

## PRAXIS Framework

*"The approach might be described as Kuhnian: in a simplified summary, we can say that Kuhn (1962) used the Copernican revolution to explain how paradigm shifts operate in the scientific community and developed an analysis of the methods and criteria for studying science. In the same sense, I intend to use the case study described below as an empirical test field to explore the possibilities of the theoretical framework of complexity science, to consider its behaviour as a scientific theory.*

*"The case was extracted from PRAXIS, an Educational Action Research project developed within academic professional learning communities (PLC) in the context of public higher education in Uruguay. As a strategy towards fostering teaching innovation, PRAXIS Project explored the potential and benefits of academic PLC for the reflection and transformation of teaching practices and the integration of digital technologies in a meaningful way into teaching. The Project approach was based on Open Science and Open Educational Practices as foundational frameworks to*



*face the challenges of critical Educational Action Research (Czerwonogora & Rodés, 2019).*

*"My thesis research wonders if it is possible to consider complexity science as a theoretical framework capable of accounting for the systems it addresses: does it have the capacity to predict possible states or future behaviors of the system? Is it suitable to describe and explain the system? Is it capable of providing guidelines referring to the intervention on the system and its control? As Strevens (2003) questioned, to which social systems might the union probability analysis (which attempts to analyse independent parts of complex systems) be successfully applied? Is it possible to characterize microvariables, macrovariables and background variables, micro and macrodynamics, in these systems?*

*"To answer these questions the thesis proposes a reflection on complexity science from the philosophy of science perspective, through the case study of PRAXIS academic PLC. The research involves two examination levels: PRAXIS case itself and the philosophical analysis of PRAXIS as a complex system.*

*"The conceptual framework is based on complexity science and complex systems. This approach can be used to understand and manage a wide variety of systems in many domains, so I see this as a great advantage. It can provide a comprehensive, cross- and transdisciplinary analytical approach that complements more traditional scientific approaches that focus on the specific subject matter in each domain.*

*"I think the biggest disadvantage has to do with the fact that this subject is associated with mathematics and the hard sciences and these disciplines are seen as difficult, not very understandable, or friendly." - Ada Czerwonogora*

Key References: Czerwonogora & Rodés (2019); Davis & Sumara (2006); Érdi (2010); Mitchell (2009); Strevens (2003)

## Rhizomatic Learning

Cormier (2008) indicates that in the rhizomatic model of learning, curriculum is not driven by predefined inputs from experts; it is constructed and negotiated in real time by the contributions of those engaged in the learning process. This community acts as the curriculum, spontaneously shaping, constructing, and reconstructing itself and the subject of its learning in the same way that the rhizome responds to changing environmental conditions.

The rhizomatic viewpoint returns the concept of knowledge to its earliest roots. Suggesting that a distributed negotiation of knowledge can allow a community of people to legitimize the work they are doing among themselves and for each member of the group, the rhizomatic model dispenses with the need for external validation of knowledge, either by an expert or by a constructed curriculum. The community, then, has the power to create knowledge within a given context and leave that knowledge as a new node connected to the rest of the network.

Key References: Bozkurt, Honeychurch, Caines, Maha, Koutropoulos & Cormier (2016); Cormier (2008); Gravett (2021)

## Social Justice

Social Justice is an example of a sociological conceptual framework used to describe the dimensions of social inequality over the decades, which has more recently been taken up by open education researchers to consider the inequalities of access, experience and outcomes within education including digital education (Lambert 2018; Hodgkinson-Williams and Trotter 2018).

Social justice is useful where certain cohorts of students appear to get unequal treatment or outcomes. Social justice frameworks most commonly are drawn from the important work of North American scholar Nancy Fraser, who talks about inequality having both economic (*redistributive*), social (*recognitive*) and political (*representational*) dimensions.

*“Redistributive justice is the most long-standing principle of social justice and involves allocation of material or human resources towards those who by circumstance have less (Rawls, 1971). Recognitive justice involves recognition and respect for cultural and gender difference, and representational justice involves equitable representation and political voice (Fraser, 1995; Keddie,*



2012; Young, 1997) (Lambert 2018, p 227).” *Recognitive and representational justice are useful dimensions to consider when sexist or racist impacts of technology or education are part of the research focus.*

*“Hodgkinson-Williams and Trotter’s work (2018) additionally translated Fraser’s ideas of ameliorative vs transformational (band-aid vs root cause) solutions to injustice to identify and compare different approaches to social justice solutions within open education pedagogy. This was used by Bali, Cronin and Jhanghani (2020) to further develop a social justice aligned framework for Open Educational Practices (OEP.)*

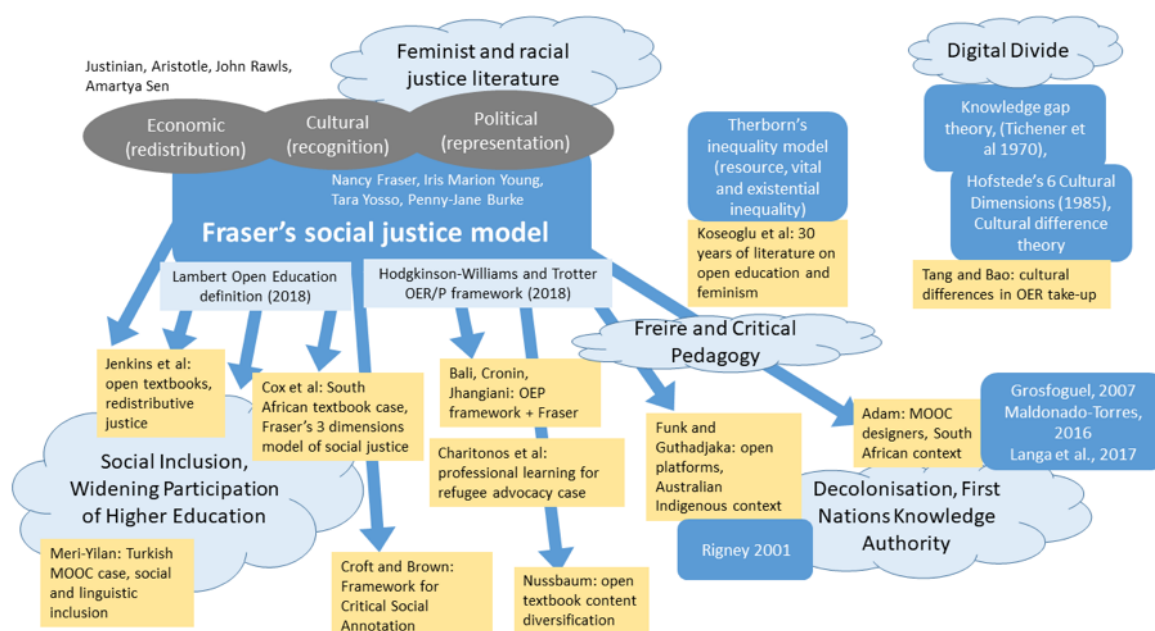
*“I used a social justice framework for my Ph.D thesis, and it was also used as an analytics framework for some of my papers. My overarching research question also used the term explicitly: How can open education programs be reconceptualised as acts of social justice to improve the access, participation and success of those who are traditionally excluded from higher education knowledge and skills?*

*“I found that open education program can enact social justice by: providing free or very low-cost programs (redistributive justice); designing programs with flexible delivery, support and linguistic options so under-represented and regional populations are more likely to participate (recognitive justice); and partnering to involve representatives of the communities to be educated in the design, learning resource development and construction of the courses (representational justice.)*

*“In a follow-on national study of open textbooks post Ph.D, I used the three principles of social justice to frame the interview questions when talking to students and staff about the potential for textbooks to be used as vehicles for social justice. The principles also become overarching themes to organise and analyse the interview transcripts, and language of each of the three principles were also evident in the headings of the final report.” Sarah Lambert*

Lambert and Czerniewicz also edited a special collection of the *Journal of Interactive Media in Education* (JIME) on the topic of Open Education and Social Justice (Lambert and Czerniewicz 2020). While many of the papers in the collection

used Fraser's three principles or dimensions to underpin their studies, there were other approaches from other parts of the world (Adam 2020; Koseoglu et al 2020; Funk and Guthadjaka 2020) including Therborn's inequality model and post-colonial theorists focussing on racial inequality in particular. This suggests that social justice conceptual models will continue to develop in response to the particular global context that the researchers are working in. Below is a visual representation of the different theorists who have influenced the different author's own conceptual mapping of social justice frameworks.



*Social justice concept map of the papers in the collection and their theoretical underpinnings  
CC-BY Sarah Lambert (Lambert & Czerniewicz, 2020)*

Key References: Adam (2020); Bali, Cronin & Jhangiani (2020); Funk & Guthadjaka (2020); Hodgkinson-Williams & Trotter (2018); Koseoglu *et al.* (2020); Lambert (2018); Lambert & Czerniewicz (2020)



## Social Realism

*"There are claims that Activity Theory (AT) can describe "the ways in which activities are informed by the specific setting and motives of people involved in them, as well as by the larger socio-historical and cultural networks of which they are a part" (Kain and Wardle, 2005). However, in my thesis this blurring of settings, motives and networks was viewed as conflatory and analytically impossible. Therefore, Social Realism (SR) was used to explain the causal mechanisms, especially those of individual agency. AT did not adequately explain the causal mechanisms that underlie the actions of the individual, thereby limiting the explanation of why certain courses of action have been chosen.*

*"Archer's SR was used to explore the agency of individual lecturers. The Archerian view that individuals have a life course that shapes the sense of self and that individuals make choices based on their life concerns is not made explicit in AT. SR (Archer, 2003, 2007a, 2012) was used to explain why people mediate contradictions in particular ways. SR was used in addition to AT, to use Archer's own term, to 'underlabour' AT, specifically to explain the role of the subject as an agent.*

*"These theories provided a dialectical approach that seeks to explore connections between all elements of a system as well as exploring the 'inner conversations' of the agents in the system. Three key components of SR were used in this thesis. Firstly the analytic dualism of culture/structure and agency was used to pull apart existing social structures in order to better understand the different parts. Secondly, Archer's concept of 'ultimate concern' was used to understand the motivation of these lecturers. Thirdly, the modes of reflexivity were applied to elucidate the interplay between agency, culture and structure." - Glenda Cox*

Key References: Archer (2003); Archer (2007); Archer (2012); Kain and Wardle (2005)

## TPACK Framework

TPACK stands for Technological Pedagogical Content Knowledge (Koehler & Mishra, 2009; Mishra & Koehler 2006). It is a theory developed to explain the set of knowledge that teachers need to teach their students a subject, teach effectively, and use technology. The TPACK framework emphasises the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). It has seven components:

1. Content Knowledge (CK). Teachers' knowledge about the subject matter to be learned or taught.
2. Pedagogical Knowledge (PK). Teachers' deep knowledge about the processes and practices or methods of teaching and learning.
3. Technology Knowledge (TK). Knowledge about certain ways of thinking about, and working with technology, tools and resources. and working with technology can apply to all technology tools and resources.
4. Pedagogical Content Knowledge (PCK). Covers the core business of teaching, learning, curriculum, assessment and reporting, such as the conditions that promote learning and the links among curriculum, assessment, and pedagogy
5. Technological Content Knowledge (TCK). An understanding of the way technology and content influence and constrain one another.
6. Technological Pedagogical Knowledge (TPK). An understanding of how teaching and learning can change when technologies are used in particular ways
7. Technological Pedagogical Content Knowledge (TPACK). Underlying truly meaningful and deeply skilled teaching with technology



*"I am interested in working with practitioners and experts of teaching (e.g., teachers) to co-design educational materials (e.g., OER, computer software) that are effective and pedagogically meaningful. So far I have worked on making intelligent tutors and OER using visual representations for helping students learn math problem solving. One framework that I have used a lot is Koehler and Mishra's TPACK framework. It provides a nice high-level description of the aspects which researchers (and practitioners) need to be aware of when thinking about technology integration into an educational setting. In the context of OER use/adaptation, researchers can use TPACK to understand (in an earlier phase of the research) what aspects of OER integration they would need to investigate (i.e., content, technology, and pedagogy)." - Tomohiro Nagashima*

Key References: Rets, Rienties & Lewis (2020), Koehler & Mishra (2009); Mishra & Koehler (2006)

## Unified Theory of Acceptance and Use of Technology (UTAUT)

Like diffusion of innovation, the Unified Theory of Acceptance and Use of Technology is a technology adoption model. Proposed by Viswanath Venkatesh and others it sought to unify eight existing technology acceptance models with regards to IT. UTAUT proposes four key constructs in determining user behaviour: 1) performance expectancy, 2) effort expectancy, 3) social influence, and 4) facilitating conditions. OER and related practices can be viewed as a technology acceptance issue, and so explanatory models such as this can be useful when analysing user adoption.

*"The UTAUT framework adapted by Mtebe and Raisamo (2014) is aimed at assessing how the four key constructs -performance expectancy; effort expectancy; social influence and facilitating conditions - of the UTAUT model impact behavioral intention to adopt and use OER, leading to actual use of OER. It was used to inform the development of a quantitative, 5-point Likert- like scale questionnaire that measured stakeholders' intentions to adopt and use OER, and to gain an initial understanding of what factors facilitate or hinder the use of OER in this particular setting. The advantage of using this framework is that it is focused on*

*measuring the intention of participants to adopt and use OER and not on measuring user acceptance of technology. The disadvantage of using this framework is that it does not enable the researcher to observe or measure actual OER use.” - Viviane Vladimirsch*

Key References: Venkatesh et al (2003); Mtebe and Raisamo (2014)

## Value Creation Framework

The Value Creation Framework (Wenger, Trayner, & de Laat, 2011) is used to describe ways that networks of social learning create value for their communities.

*“Another framework that I’m using is the Value Creation Framework to explore teachers’ perceived value of an inter-institutional collaboration on sharing knowledge, practices and OER. · Perceived value can be essential for the viability of OER initiatives because “community participation consumes time, most community members experience both internal and external pressure to discover and deliver value soon after the community starts” (Wenger, McDermott, & Snyder, 2002, p. 84). This framework distincts five cycles of value: 1) immediate value: activities and interaction, 2) potential value: knowledge capital, 3) applied value: changes in practice, 4) realize value: performance improvement, 5) reframing value: redefining success. These value cycles are not hierarchical nor exclusive to one other. The strengths of the Value Creation Framework is that it provides a conceptual framework to assess different kinds of value creation in communities and networks. The authors provide definitions of the cycles of value creation, measures of value for each cycle and a toolkit to collect value creation stories.” - Marjon Baas*

Key References: Wenger, Trayner, & de Laat (2011)

## Brief guide to additional Theoretical Frameworks

Here you can find a very brief introduction to a range of theoretical perspectives which can inform your research project.

### Learner Transitions and Experiences

Theory	Simple Description	Suggested reading(s)
Ecological systems theory	The multiple environmental and social systems that impact on an individuals' experiences	Original: Bronfenbrenner (1979)  Further conceptualisation in higher education: Jones (2018)  Example in practice: Elliot <i>et al.</i> (2016)
Multidimensional transition theory	The multilayered academic, social, and emotional transitions that individuals encounter when moving from one space to another	Introduction: Jindal-Snape & Ingram (2013)  Example in practice: Jindal-Snape & Rienties (2016)
Academic resilience theory	Students' capacity to adapt and develop under uncertainty or adversity	One approach: Holdsworth <i>et al.</i> (2017)  Example in practice: Singh (2021)
Rhizomatic transitions	Construction of students' transitions experiences away from linear pathways towards more fluid, ongoing experiences	Original: Deleuze & Guattari (1987)  Further conceptualisation in higher education: Gravett (2019)  Example in practice: Balloo <i>et al.</i> (2021)
Student engagement model	Model of factors that impact students' university retention and success	Original: Tinto (1975) Example in practice: Rienties <i>et al.</i> (2012)
Liminality	Transitional space that may lead to disorientation or ambiguity	Original: Turner (1969)  Example in practice: Parker <i>et al.</i> (2012)

## Identity development and Selfhood

Theory	Simple Description	Suggested reading(s)
Student agency theory	Students' capacity to make choices within the constraints of their lived realities	One approach: Biesta & Tedder (2007) Example in practice: Tran & Vu (2016)
Identity theory	The construction of the self through interactions with experiences and culture	One approach: Hall (1996) Example in practice: Pham & Saltmarsh (2013)
Capability approach	Theory that people achieve well-being through their capabilities to be and do what they value	One approach: Nussbaum (2011) Second approach: Sen (1973; 1995) Example in practice: Fakunle (2020)
Possible selves	Approach to understanding individuals' imagined 'like-to-be' and 'like-to-avoid' futures	Original: Markus & Nurius (1986) Application to higher education: Harrison, (2018); Henderson <i>et al.</i> (2019) Example in practice: Yang & Noels (2013)
Intersectional Theory	Framework for understanding how a person's multiple identities lead to different forms of oppression and discrimination	Original: Crenshaw (1989) Example in practice: Forbes-Mewett & McColloch (2015)
Critical race theory	Recognition of race as a social construct and that social structures are inherently racist	Starting point: McCoy (2015) Example in practice: Yao et al. (2018)
Gendered racialisation	The intersecting identities of gender and race	Original: Selod (2018) Example in practice: Karaman & Christian (2020)



## Pedagogies

Theory	Simple Description	Suggested reading(s)
Critical pedagogies	Application of critical theory to education; philosophy of education that focuses on issues of social justice, power imbalances, and domination	Originals: Freire (1970); Giroux (2011)
Engaged pedagogy	Critical pedagogy approach that values relationships between student / teacher, teacher self-actualisation, humanistic approaches to education	Original: hooks (1994)
Academic hospitality	Reflection on academic staff as 'hosts' to reciprocally support students as 'guests'	Original: Bennett (2000) Further conceptualisation: Ploner (2018)
Bernstein's pedagogic devices	Theory focusing on the ways pedagogies represent symbolic control over knowledge	Original: Bernstein (2000) Example in practice: Zeegers & Barron (2008)
Transformative learning	Evaluation of past experience through the acquisition of new knowledge	Original: Mezirow (1991) Example in practice: Nada <i>et al.</i> (2018); López Murillo (2021)

## Curricula

Theory	Simple Description	Suggested reading(s)
Hidden curriculum	The unwritten lessons learned about normative values, beliefs, ethics, etc. as a result of educational provisions and settings	Starting point: Apple (1989)  Example in practice: Kidman et al. (2017)
Internationalisation of the curriculum	Inclusion of international or intercultural elements into the content and delivery of education	Starting point: Leask (2015)  Further theorisation: Clifford & Montgomery (2017)  Example in practice: Vishwanath & Mummery (2018)
Glocalisation	The blending of global and local elements in the curriculum	Starting point: Robertson (1994)  Further theorisation in higher education: Patel & Lynch (2013)
Tourist gaze	Approach to learning about other cultures as a 'guest' or 'tourist'	Starting point: Urry & Larsen (2011)  Example in practice: Vinall & Shin (2019)

## Social Learning

Theory	Simple Description	Suggested reading(s)
Communities of practice	A set of people who share a common interest or practice	Original: Wenger (1998)  Example in practice: Montgomery & McDowell (2009)
Figured worlds	Development of the self in relation to the social types in their surrounding world	Original: Holland <i>et al.</i> (2001)  Example in practice: Chang <i>et al.</i> (2017)
Cultural historical activity theory (CHAT)	Relationship between the mind and action within an individual's situated social world	Original: Engestrom (2001)  Example in practice: Straker (2016)

## Sociological Theories of Power

Theory	Simple Description	Suggested reading(s)
Bourdieuian theory	Set of thinking tools for investigating power and the way it impacts individuals and societies through structural constraints	Original: Bourdieu (1987) Helpful guide: Grenfell (2013) Example in practice: Xu (2018)
Foucauldian theory	Set of thinking tools for investigating power relationships in society, including how they influence language or practice	Original: Foucault (1972; 1977) Helpful guide: Ball (2013) Example in practice: Koehne (2006)
Gramscian theory	Theory of cultural hegemony - how the state and high economic class use institutions to maintain power	Original: Gramsci et al. (1971) Helpful guide: Mayo (2015) Example in practice: Kim (2011)

## Decolonisation / Postcolonialism

Theory	Simple Description	Suggested reading(s)
Orientalism	Negative portrayals and 'othering' of 'the East' by 'the West' which serve to maintain colonial power and assumed superiority	Original: Saïd (1978) Helpful guide: Leonardo (2020) Example in practice: Yao (2018)
Subjugation	Forced dominance of one group over another through (neo-)colonialism and violence	Original: Fanon (1967) Helpful guide in education: Leonardo & Singh (2017)
Third space / hybridity	The sense of 'limbo' or 'in between-ness' of individuals' cultural identities	Original: Bhabha (1994) Example in practice: Pitts & Brooks (2017)
Double	The experience of dual identities	Original: Du Bois (1903)

consciousness	in conflict within an oppressive society	Example in practice: Valdez (2015)
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## Mobilities

Theory	Simple Description	Suggested reading(s)
Spacial theories	Relations between socially-constructed spaces and times	Original: Lefebvre (1991)  Further theorisation in higher education: Larsen & Beech (2014)  Example in practice: Waters & Leung (2012)
Migration infrastructures	Interlinking structures that enable or constrain mobilities	Starting point: Xiang & Lindquist (2018)  Example in practice: Hu <i>et al.</i> (2020)

## Conceptual Frameworks: Advice from the Front Line

Here we summarise some advice from GO-GN researchers who have recent experience of doctoral study in open education.

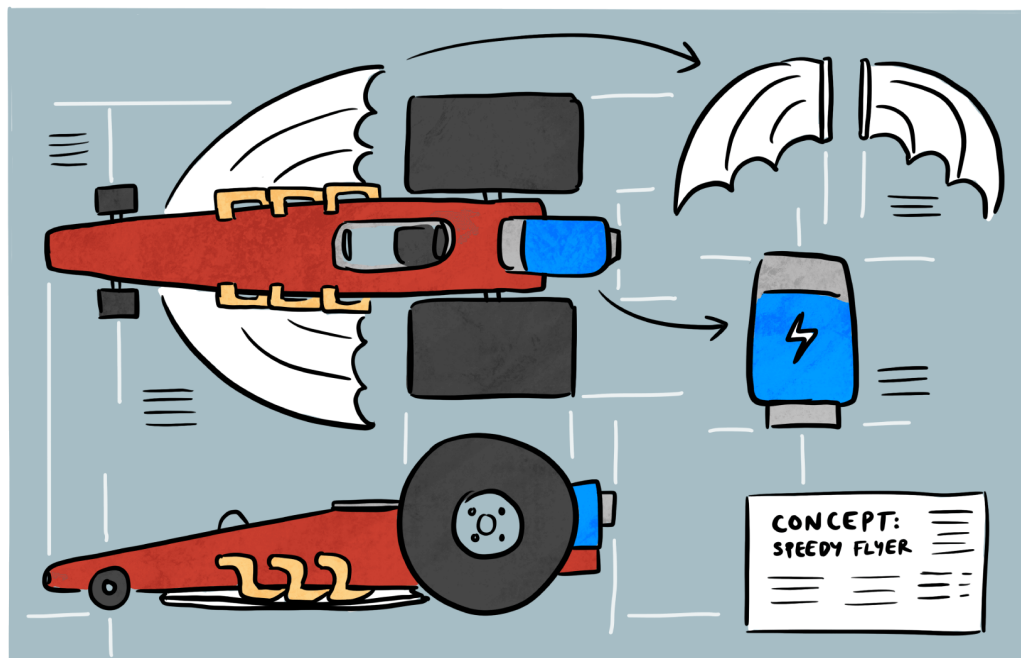
*"For starters, I would not have chosen to use mixed methods or mixed methodology. Although case study research is quite flexible when it comes to combining both quantitative and qualitative methods, the use of more than one conceptual framework made my study confusing to readers and added an unnecessary heavy burden to my workload. Although the conceptual frameworks I used afforded me a comprehensive understanding of the phenomenon under study and did corroborate and complement each other with regards to the data collected and analyzed, I could have used just the design thinking approach and Warschauer's (2002) framework for guidance in developing the coding category labels of data amassed from the design thinking workshops. It is important to be clear how the conceptual framework(s) you use help achieve a research project's purpose. As only ten participants responded to the UTAUT survey, I had a hard time explaining to my committee its use and significance. In hindsight, I would have chosen only one conceptual framework to work with and would have developed simple survey questions to gather additional data from the population that participated in the study. It is thereby necessary to choose a conceptual framework that helps you answer your research questions, helps define the relevant variables of your study, maps out or illustrates how these variables relate to each other and helps you achieve your research goals. Ultimately, the advice I would give to other researchers is to first and foremost define your research questions and subsequently look for a conceptual framework that works in answering the research questions. Lastly, it is important to keep in mind that no research project ends as it begins or as it is originally planned. Therefore, one needs to be flexible to make adjustments and changes throughout the entire research process." - Viviane Vladimirschi*

*"Don't be seduced by what other people say you should use; think about your study and what makes the most sense for who is involved in it, the participants/stakeholders or beneficiaries, what they might like to see as a result; try out a few ideas and ways to*

*understand before committing to one; use what makes sense for you, your work, your intellectual and professional pathway and what you want to learn, gain and understand in the field. It's just the start. And it's your work."* - Johanna Funk

*"It's difficult to balance what we as emerging scholars see as our transformative work, the launching point from which we will change the world, with real life. I would encourage others to engage with the conceptual framework with which those advising them are most familiar. Embrace the established understanding of others who have done the work, find your way within that tradition. As one of my committee members put it, get the credential, then break tradition."* - Kathy Essmiller

*"Once you have the phenomenon you want to explore, concepts will emerge. Your research questions will begin guiding your conceptual framework. The literature review forms the conceptual base. The theoretical framework will most often explain the relationship between your concepts and explain why the relations occur in particular ways."* - Glenda Cox



*"As much as the Ph.D is about exploring interests, the more you can do from the beginning to hone in on and work toward your dissertation, the more you'll thank yourself in those final years. The more papers and projects you can structure around your topic*

*--even if they only intersect with aspects of your topic -- the more time and energy you will save yourself farther along in the process. It is also worth keeping the project in perspective. A dissertation is a very important project, yes, but it's just one of many projects you will complete along your career. Just write the paper."* - Elizabeth Spica

*"Read widely; look at what gaps OER research currently has and do research that addresses one of those; do a pilot because it helps understand what construct it is possible to explore with what kind of data; try to enjoy your topic. Most OER research has an underlying moral imperative - making learning resources more accessible, global and free - doing this research made me feel better about myself :)"* - Irina Rets

*"I would give the same advice as I received from my main supervisor: Use time the first year(s) to make proper analysis of various conceptual frameworks before you decide which one to apply to your research."* - Anne Algers

*"Read a lot of papers of other GOGN researchers to get a feeling of the different kind of frameworks that are being used in open education research. Read a lot of papers on educational research on topics that relate to your research and see what kind of frameworks are being used. Do not stick to the framework that you have selected at the beginning of your Ph.D. If it becomes clear that another framework might suit better, then let go of the old framework (and all the investment that you've put in it) and embrace the new framework. Ask other GOGN'ers for help or advice when struggling with choosing or working with conceptual frameworks."* - Marjon Baas

*"My supervisor gave me this advice after I had been struggling with my conceptual frameworks chapter for some time: The focus of your conceptual frameworks chapter should be on describing the frameworks as they are used in the literature. Don't try to reinvent them before you have used them in your data analysis. Also, if you are using two conceptual frameworks that are not usually used together in the literature, describe them separately for now. You might arrive at a new version of a framework (or a*



*combined version of two frameworks) after you have done your data analysis, but that is not the task for now!" - Gabi Witthaus*

*"Although I am still far from the end of the process but not at the beginning of the research (the case study has a sufficient level of development for the purposes of this thesis), the philosophical analysis from the perspective of the philosophy of science is the next stage (starting!), and the most challenging. In addition to exchanges with my supervisors, Pat Thompson has inspired many reflections on the conceptual framework. I agree with [her vision of the theoretical framework](#) as a big component that gives coherence to the project: a structure that is used to design a study, generate data and analyse it; provides borders which allow to decide what is included and what is not. Is a basis for connecting to other research (and eventually compare the results generated by this framework with others) and in this sense, also a potentially reusable approach which can be duplicated with other topics and/or data. Most important of all, I think of it as a linked set of parts, ideas which guide the writing and help to create the red thread of argument. I'm working to achieve the red thread... At this stage, I think that the conceptual framework should be developed as I go back and forth between analysis and theory, providing support to the construction of research, like a puzzle where each piece should take its rightful place. The writing must also accompany the process and not be left to the end." - Ada Czerwonogora*

*"I spent ages and ages reading about the Communities of Inquiry framework and it led to a dead end, but I learnt a lot along the way..." - Gabi Witthaus*

*"It's difficult to balance what we as emerging scholars see as our transformative work, the launching point from which we will change the world, with real life. I would encourage others to engage with the conceptual framework with which those advising them are most familiar. Embrace the established understanding of others who have done the work, find your way within that tradition. As one of my committee members put it, get the credential, then break tradition. I applied Diffusion of Innovations Theory and came out with understandings I did not at all expect, which I would have missed had I not applied that theory." - Kathy Essmiller*

*"My supervisor keeps telling me the conceptual frameworks chapter is the easiest one to write... I'm not convinced."* - Gabi Witthaus

*"In my thesis I generated some theory as an outcome of a systematic review - having read papers about the theory-generating powers of systematic reviews. My lead supervisor was very uncomfortable about this. While acknowledging that there was a blurred boundary between theory and conceptual framework, there was a clear message that Ph.D students did not create theory. So the solution was just to call the thing I generated a conceptual framework, and not claim it as 'theory'. They were happy with that. I got the thing published, so I guess I was happy with that! But I was left with a feeling that there was an issue of status about who gets to create theory. I only later read feminist theory which produces excellent argument for democratising the creation of new theory - even PhD students!"* - Sarah Lambert

*"I think it's less scary to approach theory when thinking about it as explanation. I often distinguish between theory and conceptual frameworks in terms of micro to macro focus, theory as "grand theory" and conceptual framework as having a finer granular focus on a part of the learning and teaching landscape. But at the end of the day, they are both explanations - they both explain why or how certain things happen."* - Sarah Lambert

## Conclusion & Reflection Prompts



In this guide we have provided an overview of different ways of thinking about the use of conceptual frameworks in research. We also presented reflections on the use of some frameworks in doctoral research in the field of open education.

A doctoral study programme is usually the first time anyone is expected to engage with conceptual frameworks in detail. The short answer is that there are a lot of ways to go about this aspect of research and there remains relatively little written about conceptual frameworks (compared with something like research methods). It's hard to be too prescriptive about selecting and using a conceptual framework since this can be where original and unique approaches are developed.

It's necessary to think about the value a conceptual framework can bring to a study rather than seeing it as just another section that you have to write and put in place. A conceptual framework can form the organising structure for your work; help to define your remit and research methods; and provide a basis for new theoretical insights and interpretations. It's something that it's important to get right! For that reason it can be tempting to use a framework that is all encompassing, but casting your net too wide brings its own complications.

It's important to be pragmatic, and accept that no single conceptual framework will ever be perfect. But one must also aspire to find an approach that can successfully answer your research question in ways that others can understand. Data collection and analysis should make sense in relation to your conceptual framework - this ultimately supports the progression and completion of research projects. We hope

that this guide supports you in selecting and working with a conceptual framework in your research!

## 10 Problems with Theoretical/Conceptual Framing

(adapted from Casanave & Li, 2015)

1. *No framework!*  
The reader cannot clearly understand the theoretical, conceptual, or methodological assumptions that underlie a study
2. *Inappropriate framework*  
The chosen framework does not align theories with data appropriately
3. *Framework/data misalignment*  
Framework does not connect with the rest of the study
4. *Imbalance between a framework and data*  
Big ideas, big concepts... but without the data to support them
5. *Incomplete, superficial or inconsistent treatment of a framework*  
Inconsistency in theoretical focus
6. *Misinterpretation of a theory*  
Relying on buzzwords instead of developing a thorough understanding
7. *Lip service*  
Using big names and big concepts without evidence of understanding
8. *Attraction to popular theories*  
Popular theories still need to fit a study well
9. *Conspicuous absence*  
Influential name or concept missing, suggesting failure to read widely
10. *Methodology missing*  
Failure to explain underlying principles of inquiry; epistemological stance

## Bordage's key points for using Conceptual Frameworks

Here are Bordage's (2009) 13 key points for using conceptual frameworks; Bordage's advice can be seen as agnostic about the specific constellation of theories, resources, perspectives and values that inform a conceptual framework.

1. Conceptual frameworks help understand (illuminate) problems.
2. Different conceptual frameworks emphasise (magnify) different aspects of the problem or elements of the solutions.
3. More than one conceptual framework may be relevant to a given situation.
4. Any given conceptual framework, or combination of frameworks, can lead to a variety of alternative solutions.
5. Conceptual frameworks can come from theories, models or evidence-based best practices.
6. Scholars need to apply (not just pay lip service to) the principles outlined in the conceptual framework(s) selected.
7. Conceptual frameworks help identify important variables and their potential relationships; this also means that some variables are disregarded.
8. Conceptual frameworks are dynamic entities and benefit from being challenged and altered as needed.
9. Conceptual frameworks allow scholars to build upon one another's work and allow individuals to develop programmes of research.
10. Programmatic, conceptually based research helps accumulate deeper understanding over time and thus moves the field forward.
11. Relevant conceptual frameworks can be found outside one's specialty or field.
12. Considering competing conceptual frameworks can maximise your chances of selecting the most appropriate framework for your problem or situation while guarding against premature, inappropriate or sub-optimal choices.
13. Scholars are responsible for making explicit in their publications the assumptions and principles contained in the conceptual framework(s) they use.

## Conceptual Framework Tips Sheet

(O'Sullivan & Uijtdehaage, 2013:20)

The following guidance was originally written for medical students to guide them in the use of conceptual frameworks in their own scholarship. Most of the guide describes relevant frameworks but it ends with this useful, simple language checklist (slightly edited for readability).

1. How do I find a relevant framework?
  - a. Literature search - read papers that address a similar concept, problem, phenomenon
    - i. start within your field
    - ii. then go to similar experiences
    - iii. go outside of [your subject]
    - iv. Look for thematic reviews or other lit reviews
    - v. Follow interesting papers or frameworks forward to find others who have cited them
  - b. Consult with educators / researchers for their advice
2. What if I can't find an appropriate framework?
  - a. Make sure that you are confident that NOTHING applies.
  - b. Build your own framework by linking concepts in a model that the literature supports
3. When do I bring in the framework? How much should it drive my study?
  - a. If you have a framework that you are applying, then bring it into the introduction.
  - b. If you are trying to develop a framework, then it will come into the discussion as a result of your study.
4. What if I already started my study and didn't have a framework?
  - a. Often you have followed a logical path that can fit existing frameworks. Find one that can accommodate what you have done
  - b. Recognize this is not the strongest position to be in!
5. How do I incorporate the framework into my intro and my discussion?
  - a. In the introduction the framework usually flows from the key literature and before the purpose statement
  - b. In the discussion after the initial summary it is important to describe how your findings support or fail to support the framework. Thus the

framework can be a substantive amount of the discussion

6. How deeply do I have to read about a conceptual framework?
  - a. It shows in a manuscript if you have failed to sufficiently understand your framework. It will feel as if you just "threw it in."
  - b. Make sure to read a seminal work, a review article and some of the most recent applications.



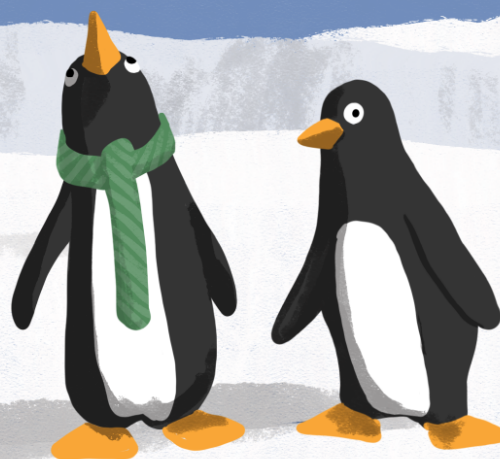
## Research Design Template

Here's a blank version of a table referred to earlier - you can use this to keep track of different aspects of your research project.

Elements of your research approach and design	Position or stance, and implications	Possible underpinning constructs
Focus or title of the study		
Ontological and epistemological position		
Methodological approach		
Methodological design		
Data collection methods		
Data analysis methods		

Underpinning constructs across research design template  
(Adapted from Passey, 2020:9)

# RESEARCH REVIEW



GLOBAL OER  
**GO**  
**GN** NETWORK  
GRADUATE

## GO-GN Research Review

### Introduction to Research Reviews

Our *Research Reviews* summarise some state-of-the-art research relevant to open educational resources (OER) and open educational practices (OEP) that was published between 2020 and 2022. The reviews of these articles were written by doctoral and post-doctoral researchers who work in relevant fields and are members of the Global OER Graduate Network (GO-GN).

The reviews focus on the relevance of the papers for educational technologists, instructional designers, and educators working in higher education institutions with a particular focus on research into open education.

We don't claim that the *Research Reviews* are necessarily comprehensive or statistically representative of all research in the field. The selection of the papers reviewed was primarily determined by the interests of our members and the relevance of particular areas to their own research. In that sense, they represent snapshots or moments in time where researchers engaged with the work of others constructively and critically.

Here we present the three years worth of reviews organised by theme and in approximate order of publication year.

## Accessibility

### Accessibility Challenges in OER and MOOC: MLR Analysis Considering the Pandemic Years

Ingavélez-Guerra, P., Robles-Bykbaev, V., Teixeira, A., Otón-Tortosa, S., & Hilera, J. R. (2022). Accessibility Challenges in OER and MOOC: MLR Analysis Considering the Pandemic Years. *Sustainability*, 14(6), 3340. MDPI AG.

<http://dx.doi.org/10.3390/su14063340>

Reviewed by Paco Iniesto (The Open University, UK)

In this article, the authors present a review of the state of the art in creating and managing learning resources and accessible OERs and MOOCs. As they acknowledge, this is a topic that cannot only consider academic literature but requires a combination of contextual information, scientific results, and practical experiences. The innovative aspect of this article is that it presents a review of accessibility models for OERs and MOOCs including grey literature following the Multivocal Literature Review (MLR) format. They aim to address two different research objectives (1) provide an overview of the status of initiatives in accessible learning resources and MOOCs and (2) identify good accessibility practices for the creation and accessible management of learning resources and MOOCs.

One of the interesting aspects of the paper is the detailed definition of learning objects and their seed or intersection with the OER notion. Authors define MOOCs under the umbrella of OERs within the Open Course Ware (OCW) definition including copyright and learning characteristics. Another relevant aspect is the acknowledgement that accessibility is transversal in all those components. I may disagree with the definition of accessibility following a medical model although authors recognise it cannot only be focused on technological aspects but pedagogical ones as well. To include both academic and grey literature authors create detailed assessment criteria for study quality which is acknowledged as a potential limitation to including some resources. The final number of studies is quite substantial and includes 51 publications.

In this review, through four research questions, the authors claim that it is possible to apply accessibility review methodologies with transversal actions in the creation and management of learning resources and MOOCs. As the authors suggest, the application of processes that guide accessibility in virtual education responds to subjective criteria that depend on local or institutional models of evaluation in virtual education and general guidelines. Indeed, the review shows a lack of

measurement of the impact on the applicability of accessibility in MOOCS and OERs.

Three key aspects are described:

1. There is a scarcity of information and indicators regarding the evaluation of the accessibility of virtual educational resources and courses. Studies in the review tend to focus more on design recommendations than on evaluating the effectiveness of their implementation and improvement process.
2. The use of accessibility standards is subjective and responds to evaluative models that, although they consider accessibility as an evaluative metric, it is inconsistent to reach a common implementation process.
3. There is a lack of references in the review that include a significant sample of disabled students.

The authors recognise an important need in future research is to establish the generation of guides, tools, and techniques that promote their development and strengthen their evaluation and impact. Based on this extensive and good-quality literature review, it is established that there is no accessibility evaluation model for OER and MOOCs; it is considered that it is necessary to establish accessibility guidelines to assist in the elimination of barriers, and the implementation of guidelines can favour the creation of accessible OER to generate a culture of inclusive design.

#### Satisfaction of disability students through OERs in the inclusive education setting of Alagappa University and Bharathidasan University

M.Muniyasamy, Dr.R. Jeyshankar, & K.Sathish Kumar. (2022). Satisfaction of disability students through OERs in the inclusive education setting of Alagappa University and Bharathidasan University. *International Research Journal of Education and Technology*, 04(03), 20–25. <https://doi.org/10.5281/zenodo.6366883>

Reviewed by Paco Iniesto (The Open University, UK)

The authors of this study aim to identify how satisfied disabled students were using OERs at Alagappa University and Bharathidasan University in Tamil India. In this case, the authors define accessibility as the means that the learning experience, including its learning material and teaching process, are changed according to students' requirements to have equitable learning experiences, using, therefore, a centred-based approach.

In the paper there exists the perspective that OERs are created by educators who are not necessarily ICT specialists and their need to commit to accessibility requirements. In that sense, the Open University in the United Kingdom is used as an example of an accessible OER repository through the Open Learn platform. Authors, as well, review in a quite minimalistic and descriptive way 10 literature reviews and studies in the area.

To identify the satisfaction of disabled students in their institutions, the authors surveyed 54 students among both institutions, mostly reporting physical disabilities and a few visual and hearing impairments. For the analysis, the approach was to use a descriptive approach. Unfortunately, neither the OERs under review nor the questionnaire is included in the paper (or any type of constructs). Moreover, the scale used is missing although a Likert of 5 values can be deducted.

Responses with better acceptance were "Free online teaching-learning method through OER" and "Disability students can use OER anywhere, anyplace, and anytime." With worse results "OER is suitable for disability students", an aspect that raises questions about the consistency of the methodology. These results presented are derived from research in face-to-face teaching, authors claim those results are as relevant and applicable to learning, teaching, and curriculum design in distance learning and virtual contexts, but that claim is not demonstrated and is difficult to believe when reflecting on the varied needs of students in both environments.

The authors acknowledge the limitations of the sample with a limited number of participants with a reduced number of close-ended questions. At the same time point out the need to run similar studies at primary and secondary levels in the Tamil Indian context to raise awareness of the need for more inclusive education. Finally, the authors conclude that training on inclusive education and disability can change people's perceptions of what disability is and the different realities university students face. While in general, this study indicates an awareness of determination to produce accessible OERs, it shows very preliminary, exploratory and limited research in both methodology and sample with respect to generalisable conclusions.

## Community Conversation: OER for Diversity, Equity and Inclusion in STEM Classrooms

Donovan, S. S. (2022). Community Conversation: OER for Diversity, Equity and Inclusion in STEM Classrooms. BioQUEST Curriculum Consortium, QUBES Educational Resources. doi:10.25334/GKZA-DA83  
<https://qubeshub.org/publications/2886/1>

Reviewed by Emily Helton (West Virginia University, USA)

This is a 20-minute video by BioQuest highlighting the work of four authors around the theme of DEI in STEM classrooms. It can be accessed on YouTube via:  
<https://www.youtube.com/watch?v=oepaWuFCPKo>.

Ben Negrete talks about the effect of dead zones on fish:  
<https://qubeshub.org/publications/2492/1>. This is a fifty-minute lesson designed for undergraduates, who graph data, make interpretations, and hear from the scientist who collected that data.

Hayley Orndorf talks about Universal Design for Learning:  
[https://qubeshub.org/community/groups/opening\\_the\\_pathway/collections/universal-design-for-learning-resources](https://qubeshub.org/community/groups/opening_the_pathway/collections/universal-design-for-learning-resources) This is part of a collection that links to resources provided by CAST <http://udlncampus.cast.org/home>

Mary Mulcahy talks about redlining's impact on health as an example of integrating social justice into STEM classrooms: <https://qubeshub.org/publications/2347/3>. This is an hour-long lesson intended for high school and undergraduate students, who investigate connections between historical redlining (denial of housing based on race) data and health outcomes.

Yarid Mera connects social justice to biology through teaching about cancer:  
<https://qubeshub.org/community/groups/coursesource/publications?id=2775&v=1>. This is a fifty-minute lesson intended for introductory or mid-level molecular biology undergraduates and uses a process-oriented guided inquiry learning (POGIL) approach.

Each author speaks for a few minutes about their resource, their rationale for creating it, and how it could be applied in the classroom. It's a succinct introduction to these resources and researchers, and has the feel of a virtual "brown bag" lunch meeting. The video concludes with a tutorial on how to search [QUBES](#) using tags.

Open Educational Resources & Accessibility: A Wholistic View



Wiegand, Stephanie (2022). Open Educational Resources & Accessibility: A Wholistic View. *Teaching, Learning & Assessment*, 74.

<https://digscholarship.unco.edu/tla/74>

Reviewed by Glenda Cox (University of Cape Town, South Africa)

This presentation by Stephanie Wiegand (who is a textbook affordability librarian) will be useful for new academics starting to develop teaching resources. It will also be a good resource for academics who know very little about OER, Open Textbooks and accessibility. The emphasis is on how to integrate OER into a course for accessibility and affordability. Wiegand has many years of experience that she draws on for this presentation.

Wiegand discusses definitions of OER and open access. She talks about accessibility principles including Universal Design for Learning. There is a useful accessibility checklist from Boise State that is a suggested starting point when academics think about accessibility. She lightly touches on issues of inclusion.

The presentation is possibly a little long, and it would be useful to integrate these slides into a workshop setting with activities. It is contextually relevant to an American audience and especially institutions that use Canvas as their learning management system.



## Open to Inclusion: Exploring Openness for People with Disabilities

Liyanagunawardena, T. R., Adams, A. A. & Williams, S. A. (2020). Open to Inclusion: Exploring Openness for People with Disabilities. In Conrad, D. & Prinsloo, P. (eds.) *Open(ing) Education: Theory and Practice*. Brill.  
[https://doi.org/10.1163/9789004422988\\_008](https://doi.org/10.1163/9789004422988_008)

Reviewed by Paco Iniesto (The Open University, UK)

Authors in this book chapter discuss very conscientiously the aspects that openness brings into inclusion. First defining accessibility (slightly too focused on technical and web accessibility) and presenting definitions of OERs (Open Educational Resources) and MOOCs (Massive Open Online Courses). Authors then combine the existing literature review in accessibility in OERs and MOOCs moving into legal frameworks such as those existent in Ghana, Japan, Sri Lanka, the United Kingdom and the United States. This perspective gives a global perspective turning away from a Global North unique point of view. Authors point out the variety of profiles of OER content creators, which can range from learners through enthusiastic amateurs and professional educators, to world authorities on the topic and how that can impact the quality and accessibility of the content. Then, in the most interesting aspect of the chapter, the authors use four fictional personas: Khalid, Sophie, Arun and Chamari to let the reader explore with them the obstacles they have to overcome in accessing OERs and decide whether the difficulties they encounter may differ had these learners happened to live elsewhere in the world. Their visions help to escalate the discussion about accessibility awareness in OERs to support inclusion, showing the contrast between legislations and cultures and how they can affect accessibility.

Authors agree that disabled learners already face many problems in accessing education, but the increased provision of open resources may or may not benefit them. That is indeed very relevant since it contrasts with the definition of openness of increasing educational inequality between learners, suggesting instead that expanding the provision of open resources can sometimes increase educational inequality between learners. Legislation requires the provision of equal access for all learners. The level of enforcement of such legislation varies in different countries, resulting in unequal opportunities for disabled learners globally. That aspect is more relevant in OERs where there is very little support for disabled learners. Authors propose the development of authoring tools and differentiate between the support given in MOOCs, which in general are created by institutions with the support of the platform provider. In contrast, individuals can create OER without such support. Fortunately, as the authors report, there are several OERs available to educate resource designers and creators. At the same time, it is relevant to look at the community of learners and their potential to create accessible content in a

crowdsourced way. This book chapter is not only interesting for the compilation of sources and the original use of personas. It is also because it raises awareness in accessibility aspects within the Open Education community that do not always align with current accessibility research and help to reflect on the next steps: we need to consider to produce inclusive OERs for all learners.

**Accessibility of Open Educational Resources: how well are they suited for English learners?**

Rets, I., Coughlan, T., Stickler, U., & Astruc, L. (2023). Accessibility of Open Educational Resources: how well are they suited for English learners? *Open Learning: The Journal of Open and Distance Learning*, 38(1), 38-57.  
<https://doi.org/10.1080/02680513.2020.1769585>

Reviewed by Paco Iniesto (The Open University, UK)

Authors in this paper examine the readability of 200 OERs in English from two major OER course platforms (OpenLearn and Saylor Academy). The paper starts with the definition of OERs followed by the researchers, which comprise those provided by William and Flora Hewlett Foundation and UNESCO. Authors highlight the prevalence of OERs in English and the barrier that this imposes in terms of making OERs accessible to all those for whom the linguistic complexity of the English language used in OERs can be a concern. Since translating OERs would require much additional work on the part of OER platforms. Authors propose the reduction of linguistic complexity of OER reading materials to improve their understandability as a plausible solution for all those using English as Second Language (ESL), which is the case of many academics like the one writing this review.

The methods proposed include a selection of OERs at different educational levels and subject categories using inferential statistics and cluster analyses. Metrics include, among a total of 22, average sentence length, counting syllables per word and per sentence, reading ease, noun elements and logical connectives. The proficiency level was measured using the Common European Framework of Reference for Languages Learning (Council of Europe, 2001). The authors intelligently make it clear that the aim of this study was not to compare the platforms. Because also the platforms differ in the way that they structure subject matters and levels, pointing out that the use of multiple platforms is a means to assess whether the patterns in the findings are consistent and generalisable.

Authors claim in their results that there is a progression of difficulty between lower and higher educational levels with introductory courses being easier to read. However, the authors' analysis also highlighted that more than 86% of the courses

require an advanced level of English language proficiency. As well authors suggest subject matter does not appear to be linked with the readability of the courses.

This paper covers a rarely researched space in the area of open education. It certainly seems complicated as the authors themselves confirm as a limitation that there is no standard combination of readability tests or consensus on the readability metrics that should be used to evaluate the difficulty of the text. Any reader at this point is eager to follow the progress of this research to produce guides that can help to generate more accessible use of English for all readers. Even how those guides could be applied to other languages. In a certain way, some doubts that arise as a reader is how said work would be applied in practice to topics that may be complex or very specific, and therefore even tricky for native readers. Also, how writers are going to change their writing habits by being aware of how they can help their readers to understand the content better. This is an investigation to keep track of. To finalise, I guess I cannot avoid wondering why *Open Learning: The Journal of Open and Distance Learning* is not an open journal with its name.

#### Accessibility within open educational resources and practices for disabled learners: a systematic literature review

Zhang, X., Tlili, A., Nascimbeni, F. et al. (2020). Accessibility within open educational resources and practices for disabled learners: a systematic literature review. *Smart Learning Environments* 7, 1 <https://doi.org/10.1186/s40561-019-0113-2>

Reviewed by Paco Iniesto (The Open University, UK)

This paper claims OERs and OEPs (Open Educational Practices) have the potential to facilitate meeting the needs of disabled students to increase their accessibility and e-inclusion capabilities in educational settings. It is sure there is limited research to date and that it has provided a limited understanding of accessibility within OER and OEP to aid researchers in pursuing future directions in this field. Authors start their paper with a comprehensible argumentation about the potential of OERs and OEPs following UNESCO and United Nations agendas for sustainable development. Authors coherently consider the impact that their inclusion in institutional policies would bring in terms of accessibility in a broad sense of the term. Then it is time for the definition of accessibility which is limited to the framework from the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3), which limits accessibility to a web technical aspect missing its educational or pedagogical context much needed in OERs and OEPs. On the other hand, it helps to frame authors' research following the four principles of the Web Content Accessibility Guidelines (WCAG): Perceivable, Operable, Understandable and Robust.

The search for the systematic review included databases such as ScienceDirect, Wiley Online Library, IEEE Xplore Digital Library, Core Collections of Web of Science and Taylor & Francis Online. Authors reviewed 31 papers, from a total of 1617. In the process sensible criteria to select the papers excluded those that were not in English, did not discuss openness using OER and OEP for learning accessibility, did not focus on disabled students or did not have available full text online. Authors then disclose the results by year, countries, keywords which seem not very relevant information to a reader interested in accessibility. More appealing is the distribution of papers according to disability type, which shows the lack of disabilities specification in research or if specified there exists a preponderance of visual and hearing disabilities. Other disclosed aspects include the predominance of OER systems design and frameworks and the use of various accessibility evaluation methods to check WCAG.

Finally, the authors disclose the 31 papers following the four WCAG principles referred to previously. The results obtained highlight that accessibility is still an area that needs more research within

OER and that researchers should focus more on considering the four accessibility principles within WCAG. However, these principles are mostly technical and have limited impact on evaluating pedagogical aspects. More relevant is the claim that limited focus has been given to assistive technologies using OERs. Authors finally claim to provide several recommendations to increase accessibility within OER and help design more accessible OER. Those recommendations include more international researchers getting involved in this research field; more research on authoring tools to produce OERs; further research should be conducted to investigate the effectiveness of OER and OEP in providing accessible learning experiences. Researchers should apply learning analytics to flag accessibility barriers. This paper, therefore, points out several areas which seem relevant to consider in future research about accessibility and OERs/OEPs. This type of research is very valuable to raise awareness within the open education community. However, the number of papers analysed is reduced and the framework is limited to technical aspects.

## Adoption Studies

Open Textbooks: Quality and Relevance for Postsecondary Study in The Bahamas

Bethel, E. (2020). Open Textbooks: Quality and Relevance for Postsecondary Study in The Bahamas. *The International Review of Research in Open and Distributed Learning*, 21(2), 61-80. <https://doi.org/10.19173/irrodl.v21i2.4598>

Reviewed by Glenda Cox (University of Cape Town, South Africa)

The quality of open teaching materials is considered a barrier to adoption of these materials by faculty. There are different views around whether quality assurance should be part of the production of open materials and or whether it should be up to the author or user of the materials to assess quality. This paper provides an excellent and easy to use method of assessing the quality of open textbooks. The open textbooks are from repositories in Canada and North America. The open textbooks were measured to check how relevant they are for use in the Bahamas. This is useful empirical work that open textbook advocates and researchers in higher education institutions in developing countries can use to make an argument that Global North texts, especially in the Sciences can be used in their classrooms.

The quality measurement tool has four measures; pedagogy, openness, accessibility, and relevance. Pedagogy is divided into 5 items adapted from the TIPS framework (Kawachi, 2014). This is a useful checklist for designers of open materials. Relevance is also a particularly useful category and the open textbooks were rated against local higher education course outlines and topics. This kind of mapping is needed to promote open textbooks and assist OER advocate and/or librarians who are trying to locate relevant textbooks. The open textbooks matched well to the course outlines and topics. The paper includes the research instruments.

Textbooks were chosen from Openstax CNX and BCcampus OpenEd repositories. A total of 41 textbooks were evaluated. Coders rated the texts according to the four measures.

Pedagogical quality varied. Most of the texts scored highly as they had set out clear learning objectives, diagrams and graphs, activities and practice exercises. The texts were also checked for post-assessments and those that scored highly in the other areas also had some form of assessment. One pedagogical measure was whether there was any pre-assessment, but few texts scored highly in this area. Texts used Creative Commons licences and only one textbook was not free. Texts were available in various formats. On average 74% of the texts matched with local content.

The paper ends with a list of recommendations for future advocacy work including awareness raising, faculty capacity building and exploring current faculty textbook use. The author also intends to continue testing and validating the quality tool.

## Institution initiatives and support related to faculty development of open educational resources and alternative textbooks

McGowan, V. (2020). Institution initiatives and support related to faculty development of open educational resources and alternative textbooks. *Open Learning: The Journal of Open, Distance and e-Learning*, 35:1, 24-45, DOI: 10.1080/02680513.2018.1562328

Reviewed by Glenda Cox (University of Cape Town, South Africa)

McGowan (2020) provides us with a very useful and timely analysis of institutional support for OER and open textbooks. The study is situated in the US but it is nevertheless useful for researchers, faculty supporting OER and advocates globally. It provides a first attempt to find themes and analyse how various higher education institutions have used grants and other forms of support to enable OER use, adaptation and creation. The paper argues for the need for institutional support to encourage the use and creation of OER including open textbooks.

The author has completed a content analysis of the websites of 37 higher education institutions in the US. This quantitative study then develops a comprehensive set of themes which in turn have variables (also called factors) that are clearly described.

This paper tries to achieve a lot in summarising what seems to be a huge amount of data and hopefully future papers by the author will get into more detail about certain aspects as sometimes it feels like the author moves over interesting findings very quickly.

One recommendation is to consider tightening up the definition of open textbooks and the use of open/alternative and affordable is a descriptor. It is very important to always emphasise the open licence as the basis of open. Alternative and affordable do not imply openly licenced. The author provides some evidence that "open models are less sustainable than low cost models" .

The paper includes many interesting findings, highlighting some that need further research. Student savings are still an important argument for the use of open textbooks but the savings and cost of producing these OER is tricky to calculate and there is a need for studies with more data. Grants given were mostly for OER designed to support initiatives designed and created for high need programmes. Those programmes will have the most impact on student graduation. Grant criteria did not seem worried about past OER experience. It seems that institutions presumed faculty would not be OER and/or that there was a lack of copyright and fair use training at institutions. The author states that 51% of grants required an orientation which presumably would include some training in Creative Commons or other open licenses. Perhaps surprisingly, quality was not a concern. Despite the attempts of disability units to raise awareness of the need to consider accessible

formats, accessibility was also not a priority and was not specified as a criterion. Grants were managed by teaching units or the library. The author felt there was some tension there and perhaps these should be handled by one or the other. Institutions manage these grants differently and perhaps what is most important is that these units work together where necessary. The author also discusses the debate around the creation of OER being intrinsically or extrinsically motivated. There are examples where authors create OER with no grant support and this is an intrinsic motivation.

This paper is a very useful description of institutional grants supporting OER. It fills an empirical gap and although the author concludes that more detail is needed around how institutional support can enable OER, this paper provides a robust model for institutions to consider and for researchers to apply in order to better understand the nature of these grants

The cathedral's ivory tower and the open education bazaar – catalyzing innovation in the higher education sector

Rabin, E., Kalman, Y. M. & Kalz, M. (2020) The cathedral's ivory tower and the open education bazaar – catalyzing innovation in the higher education sector. *Open Learning: The Journal of Open, Distance and e-Learning*, 35:1, 82-99, DOI: 10.1080/02680513.2019.1662285

Reviewed by Marjon Baas (Leiden University / Saxion UAS, Netherlands)

In this conceptual paper the authors examine if open education will replace traditional higher education or whether it will augment it. Most often the replacement narrative is applied in which it is stated that open education will replace traditional higher education, but the authors propose an alternative narrative in this paper. They do this through the use of Raymond's (1999) metaphor of the cathedral and the bazaar. The authors state that ("cathedral") higher education institutions (HEIs) that wish to successfully cope with the changes that we are facing as a society should not be threatened by "bazaar" type organizations (open higher education sector) but should have close relationships with them as it can help them innovate, bridge boundaries and increase creativity.

After a short introduction in which the structure of the paper is explained, the authors zoom in on the narratives that exist around open education and higher education. Open education is often seen as a replacement of traditional HEI, supported by the fact that open education can be seen as a disruptive innovation, has zero marginal costs characteristics and can contribute to the unbundling of higher education. To prevent that HEI will blindly adopt the replacement narrative, the authors take the reader with them on their own alternative narrative. They do

this by explaining different business models components in relation to HEI. After this they elaborate on the metaphor of the cathedral and the bazaar in the higher education sector. This section requires some focused reading as it explains the core principle of the article. The authors tried to make it as concrete as possible by giving examples of such cathedral- and bazaar-type business models. As a conclusion of their overview of the conceptual framework, an analytical framework is proposed that could assist in the analysis and comparisons of whether HEI business models are more cathedral- or more bazaar-like. Most HEI fall somewhere along this continuum. This section requires some expertise of the readers to fully understand and conceive the implications of this proposed narrative. That being said, in the discussion section the authors provide a really practical and must-needed illustrative example of using this framework to compare different business models (a traditional university, Coursera and OERu). While performing such an analysis is not part of this conceptual paper, it would be really valuable to read about follow-up research on this topic.

All in all, the authors succeed in taking you as a reader on their journey in this conceptual paper in which they propose an alternative narrative to the question: 'will open education replace traditional higher education or augment it?' This paper is primarily aimed on researchers, decision-makers and policymakers in higher education and it provides them with a clearly structured and well written paper. The proposed metaphor including the analytical framework can be used to improve their understanding of the implications of digital innovation in higher education. Even though some sections might require some re-reading in order to truly grasp the meaning, it is a paper that could act as a starting point to discuss the future of HEI.

### Understanding K-12 teachers' intention to adopt open educational resources

Tang, H., Lin, Y.-J. and Qian, Y. (2020). Understanding K-12 teachers' intention to adopt open educational resources: A mixed methods inquiry. *British Journal of Educational Technology*. doi:10.1111/bjet.12937

Reviewed by Marjon Baas (Leiden University / Saxion UAS, Netherlands)

In this paper, Tang and colleagues explored teachers' intentions to adopt OER in K-12 settings through a mixed method study. The Technology Acceptance Model (TAM) was used to quantitatively measure to what extent teachers' perceived ease of use, perceived usefulness, and attitudes towards OER predicted their intention to adopt OER. Additionally, to extend beyond the TAM determinants, qualitative questions were asked to examine teachers' perceptions of and experience with OER adoption. The results show that perceived ease of use and perceived usefulness



predicted teacher intention to adopt OER. The practical implications deriving from their findings focus on how to encourage OER adoption by providing support in searching and evaluating OER as well as advocating OER within K-12 settings.

The context of this study is a K-12 setting which is really interesting since most studies undertaken on OER adoption take place in higher education contexts. The data collection itself took place in an online course. In this course, participants needed to engage in a series of Open Educational Practices. These activities did not only align with the goal of the course itself, but also ensured that teachers had experience with OEP before the quantitative data collection. By doing this, the authors tackled one of the main issues of OER adoption research, namely teachers being unfamiliar with (the defining characteristics of) OER. Additional qualitative data was collected in the final week of the online course in which participants needed to hand in their self-reflections on OER adoption. The methods section is robust, and the authors make use of existing instruments. The instruments and their statistics are provided in the supplementary information. One downside however, as noted by the authors themselves, is the limited sample size of 68 certified teachers. Even though the authors applied partial least squares regression modelling rather than covariance-based structural equation modeling, the study would perhaps have been more persuasive with a bigger sample size. Nevertheless, the authors made up for the smaller sample size by also collecting qualitative data, consisting of self-reflections teachers entered during the final week of the course. In the results section, the findings of the quantitative data are first presented quite statistically which makes it difficult to grasp the implications of this short section. However, in the next section the authors focus on the qualitative data which makes the findings more tangible. Especially the quotes they have used to illustrate the strengths and weaknesses of both perceived ease of using OER and perceived usefulness of OER are insightful. A valuable understanding of these two factors supports their findings showing that it influenced teachers' attitude towards OER. The conclusion and discussion section is elaborate and provides a clear interpretation of the results, including practical recommendations for K-12 education to support OER adoption.

Overall, this study contributes to open education research by exploring OER adoption in a K-12 setting through mixed-methods. This is an important field of study, since OER adoption still remains a challenge for many K-12 educational institutes. Many different variables interplay in OER adoption and this study provided both theoretical and practical insights related to this topic. Since the article and supplementary files are made available through open access, the results can be reviewed by all who are interested, inside and outside K-12 settings.



## Innovation

### Producing OER with convOERter: First Evaluation and Feedback

Ali, L. & Schroeder, U. (2021). Producing OER with convOERter: First Evaluation and Feedback. In Gabellini, C., Gallner, S., Imboden, F., Kuurstra, M. & Tresp, P. (edit) *Lehrentwicklung by Openness – Open Educational Resources im Hochschulkontext*. pp.45-48.

[http://www.sfdn.ch/wp-content/uploads/Lehrentwicklung\\_by\\_Openness\\_OER\\_im\\_Hochschulkontext.pdf#page=45](http://www.sfdn.ch/wp-content/uploads/Lehrentwicklung_by_Openness_OER_im_Hochschulkontext.pdf#page=45)

Reviewed by Robert Farrow (The Open University, UK)

This article presents the results of initial evaluation of a tool named convOERter which aims to facilitate the production of OER from other online resources. The prototype tool works with Microsoft Word documents and Microsoft PowerPoint presentations, replacing non-OER images with open equivalents taken from image portals like Flickr and CC Image Search. Metadata and licence information are also retrieved and integrated into the new product when it is published. This functionality is complemented by web analytics which can be used to reconstruct and build on the operation. This paper reports on the initial evaluation of the prototype.

23 participants took part in the evaluation across several different workshops. More than half had previous experience of working with OER, and more than three quarters agreed that finding suitable images is a challenge.

The evaluation is rather brief. It was found that the convOERter tool was considered easy to use and more than 90% felt that it could be a valuable tool for instructors in converting their materials to OER. However, the suitability of the substitute images got a more mixed response. Just over half (53.8%) felt that the images returned were appropriate, or that the tool encouraged them to produce more OER.

There seems to be a lot of enthusiasm for the idea of semi-automated support for OER production among those that participated in the evaluation. If the results can be improved and other types of content included in the operation then the convOERter tool could be a very interesting and useful tool for practitioners.

### The Global Micro-credential Landscape: Charting a New Credential Ecology for Lifelong Learning

Brown, M., Nic Giolla Mhichíl, M., Beirne, E., & Mac Lochlainn, C. (2021). The Global Micro-credential Landscape: Charting a New Credential Ecology for Lifelong

Learning. *Journal of Learning for Development*, 8(2), 228-254.

<https://jl4d.org/index.php/ejl4d/article/view/525>

Reviewed by Robert Farrow (The Open University, UK)

This article provides a timely overview of the landscape around microcredentials - short, accredited courses intended to be delivered flexibly - and contextualises this by highlighting their attractiveness as part of the post-pandemic return to work and digital education. The paper begins by elaborating several terms relating to microcredentials including nanodegrees, digital badges, short online courses, and micromasters, showing how different countries have shown different patterns of interest in different terms. Overall, the landscape is somewhat convoluted with many overlapping terms and strategies. The authors propose three emergent categories: from bundled to unbundled learning; from non-credit bearing to credit bearing; and microcredentials which are unbundled but credit bearing.

The authors note that lack of standardization has not hindered activity in the field, with governments, international organisations, business and higher education all showing a strategic interest. However, the case is made that greater synchronisation and harmonization is needed to enable progress. In Europe this could be provided by the coordination of national recognition frameworks with the European Qualification Framework (EQF) and the Common Micro-credential Framework (CMF) developed by the European MOOC Consortium.

An excellent summary of the state of the art in micro credentialing is conveyed, taking in different stakeholder perspectives and summarising activity in different countries and regions. The main takeaway is that there is a need for a common and unified credential ecosystem that incorporates microcredentials; is transparent, using a common language; and is flexible, offering multiple pathways to recognition and engaging employers. It is suggested that some regions (Europe, Australasia, Canada) are in advantageous positions to offer this.

Navigating support models for OER publishing: case studies from the University of Houston and the University of Washington

Santiago, A. and Ray, L. (2020). Navigating support models for OER publishing: case studies from the University of Houston and the University of Washington.

*Reference Services Review*, Vol. 48 No. 3, pp. 397-413.

<https://doi.org/10.1108/RSR-03-2020-0019>

Reviewed by Rebecca Pitt (The Open University, UK)

This paper presents two examples of US higher education institutional support for developing and publishing OER. Both case studies provide guidance and support

for institutions who are at the initial stages of considering how best to support educators who are publishing OER at their institution.

There is currently little literature or examples of institutional OER publishing programmes available. However, this paper, and others noted, provide a number of varied examples to draw on. These fall into two categories, as identified by the Open Education Network (OEN, previously Open Textbook Network): minimal institutional support (e.g. educator driven with institutional support specific points) or institutionally supported throughout the duration. The two case studies discussed in this paper fall into the former category. The literature discussed surfaces issues such as workflows, approaches to sustainability and publication, and external support from organisations such as OEN and Rebus.

Presenting the motivation, method, support and outcomes to date of the University of Houston (UH) and the University of Washington (UW) reveal a number of differences in approach and context, as well as shared questions and challenges. These include the review process for open textbooks and other OER, ensuring accessibility, institutional policies and access to materials post-tenure. Developing realistic timescales for materials and how to recognise impact beyond cost savings was also important and connected to moving beyond the issue of textbook costs, which is often the primary driver for OER adoption. As discussed by the authors, continuing to focus on cost can limit development of institutional programmes to broader goals or aspirations, which ensure sustainability.

In addition to the rich detail provided by both case studies, there are very useful insights and perspectives provided by UH and UW colleagues who are specifically dedicated to supporting open initiatives at their respective institutions. The paper also concludes with a clear and pertinent set of recommendations for institutions who are considering how to embed and support the development of OER at their institutions. These recommendations are intentionally of wider interest and applicability to the open education community. Additional areas for further research and models are also considered.

## MOOCs

Examining students' readiness for MOOCs: Applying a structural equation modeling approach

Alshammari, S. H. (2022). Examining students' readiness for MOOCs: Applying a structural equation modeling approach. *International Journal of Technology in Education (IJTE)*, 5(2), 221-234. <https://doi.org/10.46328/ijte.284>

Reviewed by Martin Weller (The Open University, UK)

This article examines students' readiness to adopt MOOCs using the Student Online Learning Readiness (SOLR) model (Yu & Richardson 2015). It highlights the low completion rates and the need for learners to take greater responsibility for their own learning in MOOCs as indicators that not all learners are ready to engage with them. The SOLR model they adopt focuses on three competencies: technical competency (TC), communication competency (CC), and social competency (SC). The authors use a questionnaire to assess these competencies in over 100 learners. They report that technical and communication competencies had a positive effect on students' readiness to study MOOCs, while social competence had no effect. The authors note that other factors such as motivation could also play a part in MOOC readiness.

This is a well framed study, although limited in scope to one university and only a few subjects. It is a good reminder that the 'openness' of MOOCs is not open to everyone, and demonstrates that they tend to favour learners with existing skills and competencies.

### Recommended Guidelines for Effective MOOCs based on a Multiple-Case Study

Guerra, E., Kon, F. and Lemos, P. (2021). Recommended Guidelines for Effective MOOCs based on a Multiple-Case Study. Technical Report RT-MAC-2021-02 <https://arxiv.org/pdf/2204.03405.pdf>

Reviewed by Anuradha Peramunugamage (The Open University of Sri Lanka, Sri Lanka)

This study analyzed data from seven successful massive open online courses (MOOCs) in the fields of software technology and entrepreneurship, offered by a comprehensive online education platform (Coursera) in partnership with three public higher education institutions in Brazil (ITA, USP, and UNICAMP) that attracted more than 150,000 students in 2018–2020. A mixed-methods approach was employed for data collection and analysis. Important guidelines were established from MOOC data to assist MOOC instructors in designing courses with fewer dropouts. This is a well-structured study, but its scope is confined to three universities and a few courses. A well-explained paper on the development of MOOCs.

It assessed information about the student's profile, course withdrawal, incomplete activities, and video replays; however, it did not explain student performance. This article analyzes data on student behavior and student demographics in online courses and focuses on discovering trends in how students behave during the course. The retrieved data was used to construct charts depicting the number of students who began each activity in a given course and the number of students who completed each activity. The order of activities performed by each student throughout a course; the number of times a student performs an activity; and standard student information in a course

According to the data presented, professionals desired to recycle their knowledge by learning new techniques, programming languages, and technologies, as well as receiving business and entrepreneurial advice. The results indicated that the majority of students only watch the first videos, so the instructor should avoid assigning difficult tasks in the first week and focus on motivating the students for the course. It is recommended to emphasize the course's value to the student's life or career, as well as its significance.

Similarly, courses should not be excessively long, and longer courses should be divided into units of 3 to 5 weeks. This practice gives students more flexibility, which increases their engagement and decreases the overall dropout rate. The most significant factor is that experienced students may not want to follow the course sequentially in the order determined by the instructor, but rather prefer to skip ahead to the topics he or she believes will be more beneficial. Therefore, it is recommended to present an overview of each course module's content at the beginning of each module to allow the student to choose topics that are of interest to him or her. Instructors should consider the specific nature of the course, the discipline to which it belongs, and the attention span of the intended audience when determining the length of the videos.

Evaluation tasks are a checkpoint that students who wish to perform well in the course visit multiple times. The review of the concepts that the instructor wishes to emphasize may be incorporated into the evaluation activity as an introductory text or video, or even within the activity itself. It is also extremely helpful to have a teaching assistant who can monitor the course forum daily and respond to student inquiries as soon as possible. However, instructors should also encourage students to assist one another in the forum.

### Decrypting the Learners' Retention Factors in Massive Open Online Courses

Pant, H. V., Lohani, M. C. and Pande, J. (2022). Decrypting the Learners' Retention Factors in Massive Open Online Courses. *Journal of Learning for Development*, Vol.

9, No. 1, pp. 37-54.

[http://oasis.col.org/bitstream/handle/11599/4032/2022\\_Pant\\_Lohani\\_Pande\\_JL4D\\_Vol9No1.pdf](http://oasis.col.org/bitstream/handle/11599/4032/2022_Pant_Lohani_Pande_JL4D_Vol9No1.pdf)

Reviewed by Martin Weller (The Open University, UK)

This paper investigates factors influencing completion rates in Indian MOOCs. After reviewing the literature on retention and completion, the authors propose 8 hypotheses relating to retention factors, such as “Content localisation support will have a significant positive effect on the perceived usefulness of MOOCs”. Using a combination of survey and interviews, the authors investigate these hypotheses with relation to learners on the SWAYAM MOOC platform. Through detailed statistical analysis the authors highlight four factors as being particularly relevant in their context. These are termed Credit Mobility (ie being able to transfer study credit for MOOCs), Latest Trend Course (the currency and attractiveness of the topic), Content Localisation (primarily in the form of language), and Perceived Effectiveness (how directly useful a MOOC is for the learner).

This is an interesting paper, because, as the authors note, the Indian Government has invested heavily in MOOCs and views them as a key factor in their educational strategy. Understanding the factors that in this context will contribute to their success is therefore important for a large number of learners.



## A proposed model to design MOOCs through the lens of addressing graduate skill gap

Hossain, M.N., Hossain, M.Y., Bao, Y., Kumar, N. and Hoque, M.R. (2022). A proposed model to design MOOCs through the lens of addressing graduate skill gap. Higher Education, Skills and Work-Based Learning, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/HESWBL-04-2021-0070>

Reviewed by Anuradha Peramunugamage (The Open University of Sri Lanka, Sri Lanka)

The goal of this study is to explore the mediating impact of psychological need and immersive experience on graduates' skill gaps in massive open online courses (MOOCs) adoption intention and offered a new model for the course developer. The proposed research model is established by combining two theoretical models, namely, the self-determination theory, network externalities theory, and technology adoption theory. Data are collected from 318 respondents to test the model. Structural equation modelling (SEM) is utilized to assess the data. The study demonstrates that the perception of psychological requirements and immersive experience influences the influence of skill gap and social interaction on MOOC adaption willingness. However, immersive experience alone cannot impact adoption intention. Similarly, psychological needs cannot have a major impact on adoption intention without the graduate skill gap.

Based on the combined theoretical framework and statistical analysis, it is found that the impact of the skill gap on adoption intention is large in the presence of graduates' psychological demands. Similarly, the impact of social contact on the adoption intention has considerable implications in the context of an immersive experience. Network benefits were also found beneficial for this adoption. This study also helps by embracing the idea of immersive experience to allow improved virtual social interaction.

Research outcomes help instructional designers and course developers even though the proposed new model is not clear. The literature widely explained the importance of psychological need and immersive experience on graduates' skill gaps on MOOC. Researchers can extend these outcomes with different other MOOCs.

## Open to MOOCs? Evidence of their impact on labour market outcomes

Castaño-Muñoz, J. & Rodrigues, M. (2021). Open to MOOCs? Evidence of their impact on labour market outcomes. Computers & Education 173. <https://doi.org/10.1016/j.compedu.2021.104289>

Reviewed by Martin Weller (The Open University, UK)

This paper looks at whether participation in MOOCs has an impact on employability for the participants, specifically examining “the impacts that MOOCs have on wages and on the probability that participants in MOOCs will change either their employer or the tasks they perform within their current firm.” Improved employability is often advanced as a benefit of MOOCs, but the authors contend that there is scant research in this area.

The method they use to investigate these questions is to focus on two very employment focused MOOCs in Spanish: ‘Business Intelligence’ and ‘Communication and Marketing’. They use two surveys, one in 2015 prior to the MOOC and one again in 2017. This provides a reasonable time frame between taking the course and any related employability outcomes.

Their main findings are that MOOC participation had no impact on wages but did increase the likelihood of workers continuing to work at the same firm and performing the same job.

This kind of longitudinal study is relatively rare in MOOC literature and is a useful example of how to interrogate the claims often made about a particular innovation. The positive impact of MOOCs seems fairly limited – being more likely to be employed in the same position at the same company. The data set is of course limited, with only two MOOCs in the Spanish context, but it represents a good example of returning to the claims made regarding educational innovations (which might include OER) and examining how they have played out over time.

### Women's participation in MOOCs in the IT area

de Souza, N. S. & Perry, G. T. (2021). Women's participation in MOOCs in the IT area. *Computers & Education*, 173.

<https://doi.org/10.1016/j.compedu.2021.104270>

Reviewed by Martin Weller (The Open University, UK)

Examining data from over 4,000 learners across four MOOCs on a Brazilian platform, this paper examines whether women's student profile, persistence and grades differ from those of men studying the same MOOCs.

The student profile addressed factors such as intention to finish, time spent on the course, educational level and age group. There was no significant difference between men and women across any of these factors. The researchers also undertook a cluster analysis using performance data, and found similar groups between genders, such as “high performance students. Two MOOCs demonstrated

higher persistence for men but across all four courses, the distribution of persistence and grade was the same for men and women. The authors note that women's enrolment was much lower, and, as with many MOOCs participants were from relatively privileged backgrounds, with most having at least a bachelor's degree.

The paper combines a number of data points and a large data set. The findings, although they don't reveal a difference between men and women, are interesting, in that it suggests that for these MOOCs at least, gender is not a factor in motivation, performance and persistence.

### Exploring the reliability and its influencing factors of peer assessment in massive open online courses

Li, H., Zhao, C., Long, T., Huang, Y., & Shu, F. (2021). Exploring the reliability and its influencing factors of peer assessment in massive open online courses. *British Journal of Educational Technology*, 00, 1– 15. <https://doi.org/10.1111/bjet.13143>

Reviewed by Martin Weller (The Open University, UK)

This paper examines the reliability of peer assessment in MOOCs. The large scale and lack of formal support in many MOOCs has meant that peer assessment has often been proposed as a viable assessment method. By examining over 5,700 submissions, across 18 assignments in three different MOOCs on a Chinese platform, the authors investigate the reliability of peer assessment in the MOOC context.

They report that peer reviewers tended to give scores at the extremes and that peer assessment was not particularly reliable. The assignment type was a factor in reliability, with an e-portfolio format more reliable than assignments based on papers or proposals. The reliability of peer assessment was inversely correlated to the number of reviewers per assignment and the reviews completed per reviewer.

They suggest that peer assessment should avoid being used as a summative assessment method, and should be assigned relatively low weights to final grades and that advice should be given on how to identify medium quality work to avoid the grading at extreme ends of a marking continuum.

This paper is based on a large data set, although restricted to only three MOOCs on one platform in the Chinese context, so its generalisability may be reduced. However, it does demonstrate how initial claims regarding MOOCs are now being more effectively examined and researched. Peer assessment was proposed as a model for coping with scale and absence of formal support. However, while it has

been demonstrated to be an effective method in formal education and at small scale, this study calls into question its reliability within the MOOC model.

## Open Ecosystems

### Learner skills in open virtual mobility

Rajagopal, K., Firsova, O., Op de Beeck, I., Van der Stappen, E., Stoyanov, S., Henderikx, P., & Buchem, I. (2020). Learner skills in open virtual mobility. *Research in Learning Technology*, 28. <https://doi.org/10.25304/rlt.v28.2254>

Reviewed by Martin Weller (The Open University, UK)

This article examines internationalisation in higher education through the lens of Virtual Mobility (VM) and Open Education (OE), which it combines into the term Open Virtual Mobility. The authors focus on internationalisation within Europe, as encouraged through programmes such as the Bologna process. Through Virtual Mobility 'learners enrolled as students in one higher educational institute (HEI) have the opportunity to follow a course at another higher educational institute in the online mode.' Open education, as realised through MOOCs and OER have facilitated collaboration and allowed European HEIs to position themselves as global providers. These two methods offer different approaches to internationalisation.

The study used 'group concept mapping' (Kane and Trochim 2007), which is described as 'a mixed-methods approach in which advanced statistical analyses are applied to qualitative data'. Twenty eight participants who represented projects and networks in the two fields undertook the sorting process required in the concept mapping.

From this analysis, ten clusters of Open Virtual Mobility competencies are determined, including 'Intercultural skills & attitudes', 'Autonomy-driven learning', and 'Open-mindedness'. These clusters can be situated in terms of relative closeness to each other, i.e. the degree to which they correlate.

The authors conclude that combining VM and OE highlights 'a number of generic learner skills and competences'. These competences combine aspects of the three key drivers in the current HE: digitalisation, collaboration and openness.

Open Virtual Mobility may be a useful method to frame OER and OEP within a global education context, particularly with increasing online collaboration between

institutions arising from the online pivot resulting from the Covid-19 global pandemic. The Group Concept mapping method is potentially interesting to represent different elements that constitute a field such as OEP.

### Open Education for a Better World: A Mentoring Programme Fostering Design and Reuse of OER for Sustainable Development Goals

Urbančič, T., Polajnar, A., & Jermol, M. (2019). Open Education for a Better World: A Mentoring Programme Fostering Design and Reuse of Open Educational Resources for Sustainable Development Goals. *Open Praxis*, 11(4), 409-426.

doi:<http://dx.doi.org/10.5944/openpraxis.11.4.1026>

Reviewed by Beck Pitt (The Open University, UK)

How can open education contribute to furthering and enriching work done to progress United Nation (UN) Sustainable Development Goals (SDGs)? Critically, what potential barriers might exist to fully actualising the role of open education within this context?

This paper presents the Open Education for a Better World (OE4BW) programme, its establishment and iterative development through two cycles of mentoring during 2018 and 2019. The programme itself focuses particularly on the identified need to support the implementation and development of OER through a mentoring programme, within the context of SDGs (especially SDG4 Education).

The paper begins by positioning and contextualising OER within a variety of the challenges faced by learners and teachers, and which SDG4 aims to address. The authors provide a good overview of OER and the fundamental arguments as to why OER could provide possible solution(s) to many of the issues highlighted by SDG4, such as access to resources. However whilst open education has the potential to advance and address issues raised by SDG4, what are the potential barriers that could impede the effectiveness of open approaches?

Surveying national governments and a range of educational institutions around the world on their perceptions and experiences of OER revealed that in many parts of the world their use and development remains siloed and that capacity building is often overlooked. These insights confirm other research in this area and result in the application of Redecker and Punie's (2017) reference framework to develop the OE4BW initiative's mentorship scheme.

A detailed description of the OE4BW model and the programme's iterative improvement through surveying and detailed feedback from mentors and mentees following two cycles of implementation follows. Although participants from both

iterations had overall positive experiences of their involvement in the scheme, improvements were made to ensure OE4BW's long-term sustainability. Following the first iteration improvements included maintaining the scheme's diversity of participants and ensuring this was reflected in assigned partnerships and project management of work, particularly given the voluntary nature of the programme. These changes to the scheme yielded good results. Moreover participant commitment to the programme was evident in the continued involvement of those who had been part of the first iteration with developers/mentees involving themselves in other capacities or mentors reapplying to be part of the programme again.

Although focused on the OE4BW initiative, the experiences and recommendations outlined in this paper are of wider interest particularly in relation to developing similar unfunded voluntary mentor schemes and illustrating good practice for supporting others in a diversity of contexts. Possible replication of the scheme to directly target and progress other SDGs is also possible. As noted by the authors the longer-term impact of the scheme on participants and the implementation of OER is to be explored and this will be a critical piece in understanding the longevity and sustainability of the model used.

#### How to facilitate self-regulated learning? A case study on open educational resources

Wong, T., Xie, H., Zou, D. et al. (2020). How to facilitate self-regulated learning? A case study on open educational resources. *Journal of Computers in Education* 7, 51–77. <https://doi.org/10.1007/s40692-019-00138-4>

Reviewed by Robert Farrow (The Open University, UK)

This study uses open educational resources (OER) as a focus for investigating self-regulation by learners. This is a timely and pertinent interest. As the authors note, there is an ever growing multitude of OER available to support the learning process. As informal learning takes place beyond the reach of most research, more work is needed to understand how OER are used outside institutions.

This research considers three aspects of self-regulated learning: learning motivation, planning and management, and self-monitoring. Three surveys (N = 149, N = 168, N = 150) were used to investigate these and focus groups carried out afterwards.

The focus of the experiment was the *i-Classroom* project, a “mobile classroom” initiative in Hong Kong which provided elementary school learners with a range of OER (primarily video content) and support from faculty in the form of assessments, discussions and consultations.

Arguably this level of support is rather higher than most informal learning, and is more like a “Flipped Classroom” model (Brame, 2013; Mazur, 2009; Uzunboylu & Karagozlu, 2015). That said, finding ways to support self-regulated learning is nonetheless important.

The surveys were mostly based on 5-point Likert scales. The results were interesting. Higher graded students tended to have lower learning motivation (although this tended to improve over time). Students with lower grades tended to lose motivation when confronted with difficulties or obstacles. With respect to planning and implementation, students who felt they had better academic performance had better management of their learning but some students who felt they had less satisfactory academic performance rated themselves higher for planning competency. Most students felt competent in self-assessment, though this confidence fell with lower grades. A lot of detail on these statistical results is provided in the paper. The follow-up interviews indicate some strategies used in self-regulation, but, as might be expected in learners of this age, they are quite brief.

Connectivism (Siemens, 2005) is used as a theoretical framework for understanding the results in the context of an open online learning environment. Those interested in strategies for using OER might not find them in this paper, which is much more focused on self-regulated learning and how technology use can support this. In fact, openness of the resources seems to be largely incidental.

Motivation is identified as a key aspect of self-regulated learning, and the authors hypothesize that the pressure applied - even to young learners - by the Hong Kong schooling system may in fact inhibit learning through increased anxiety and procrastination. Crucially, those who have the confidence to approach others for advice and support may have an advantage in two ways: directly, through the support offered; and through the development of metacognition about the learning process.

## Open Educational Practices

Revisioning the potential of Freire's principles of assessment: Influences on the art of assessment in open and online learning through blogging

DeWaard, H. & Roberts, V. (2021) Revisioning the potential of Freire's principles of assessment: Influences on the art of assessment in open and online learning through blogging. *Distance Education*, 42:2, 310-326.

<https://doi.org/10.1080/01587919.2021.1910494>

Reviewed by Ada Czerwonogora (Universidad de la República, Uruguay)

The article presents 'a theoretical and conceptual exploration of Freire's (1970/2018) writings as potential principles of assessment in critical pedagogy contexts within the practical application of student blogs in online and open assessment practice.'

The authors employ Patton's (2017) principles of critical pedagogy in evaluation as a framework to guide the connection to blogging and open educational practices (OEP). The novelty of the paper is to include this view of OEP as a possible approach that educators and learning designers could consider to integrate blogging to course design. For this purpose, an open learning design intervention (OLDI) model is proposed. It is noteworthy that the model has possibilities of application not only in faculties of education, but also in other courses interested in generating a change in assessment practices. As the authors point out, higher education has advanced in the adoption of authentic assessment practices, but pivots to online learning resulting from responses to the COVID-19 pandemic have exacerbated the binary and evaluative perspectives. This theory-to-practice exploration is a way to promote assessment design beyond traditional forms, and might be helpful in particular for those new to designing open and online assessment strategies.

The article has a sequential structure, with fluid writing that addresses step by step the different aspects that inform the OLDI model, which is presented in the final section as 'a path forward into the open'.

After the introduction, the theoretical framework is described. It begins with OEP: in online learning contexts, blogging is positioned as an open practice that provides the opportunity for meaningful and authentic reflection. Then, evaluation is conceptualised and distinguished from formative and authentic assessment, and feedback. These concepts are accompanied by abundant, relevant and up-to-date literature, linking with Freire's principles focused from the perspective of open education and the blogging experience developed by the authors. Key elements of



an authentic, formative assessment practice are also abstracted in one of the figures of the paper.

The critical review about Patton's principles through an OEP lens is remarkable. It results in a reduction to five core principles of critical assessment: using evaluative thinking to cultivate critical consciousness; learning resides in communities, not just individuals; critical pedagogy must be dialogical and interactive; assessment should integrate reflection and action, thinking, and emotion; and critical consciousness is co-intentional, focusing on process and product. Each principle is related to the blogging practice developed, linking theoretical aspects to the practice, describing different tasks and possibilities for students to develop, according to learning design provided by course instructors.

In the final section, the authors characterise the OLDI model to support instructors to meet these five principles, defining the different model stages, based on previous research (Roberts, 2019). The first stage of the OLDI model is the relationship-building phase, where students engage and interact with each other. The second stage focuses on developing digital fluencies with the blogging platform, engaging students in developing their critical consciousness. The third stage is dialogical: the blogging design enables different intentional interactions, collaborations and connections with other nodes of learning. The fourth stage involves the development of learning networks that extend outward from the blog hub and individual student blog sites.

To summarise, it is worth highlighting the application possibilities of this intervention design in different contexts, and to especially point out the relevance of revisiting Freire's principles from the perspective of open education, to confirm they have future potential for assessment practices.

## Wikipedia as Open Educational Practice: Experiential Learning, Critical Information Literacy, and Social Justice

McDowell, Z. J., & Vetter, M. A. (2022). Wikipedia as Open Educational Practice: Experiential Learning, Critical Information Literacy, and Social Justice. *Social Media + Society*. <https://doi.org/10.1177/20563051221078224>

Reviewed by Beck Pitt (The Open University, UK)

This paper examines the process of editing and creating Wikipedia articles and whether it fulfils the Association of College and Research Libraries' (ACRL) Framework for Information Literacy in Higher Education criteria. The paper discusses the flexibility and range of activities that Wikipedia can potentially support within a range of contexts and how encouraging use of Wikipedia can address the encyclopaedia's long-standing issues of diversity and representation.

This paper opens with an overview of research into Wikipedia to date. In tandem with the wider acceptance, and changing perception, of Wikipedia within academic contexts is the increased use of Wikipedia as a platform where students, and the wider community, can actively engage and contribute to. As discussed, this activity can specifically focus on addressing the dominant bias of Wikipedia articles and to redress the balance so that currently marginalised groups and topics are better represented. Whilst there is a growing body of research on different facets of Wikipedia use, McDowell & Vetter position this paper "...on the intersections..." of a small body of research into social justice, OEP, critical literacy and Wikipedia as an open resource. The authors have extensive experience of using Wikipedia for their own teaching practices and publishing on different facets of Wikipedia use. Building on earlier research, this paper revisits educator and learner data from 2016 to explore further and extend earlier analyses.

Wikipedia is an example of a unique, very large, successful OER which has an open ecosystem of practices and community built up around it. The ACRL Information Literacy Framework has "six frames" which McDowell & Vetter use to illustrate how the process of editing a Wikipedia article fulfils the framework criteria and therefore can be an extremely useful way to increase valuable information literacy skills and enhance learner skills as they navigate and contribute to the platform. The paper also shows that both within formal and informal settings, Wikipedia editing can potentially combat wider societal issues such as fake news and representation.

As the authors show, understanding the process of Wikipedia editing, and how and what can be contributed, is critical. Throughout this paper the authors carefully differentiate and highlight the similarities between good academic practice (e.g. avoiding plagiarism and being aware of copyright) and how Wikipedia editing can

potentially enhance this. For example, the independence and openness of the process of contributing content involves more than just satisfying one course educator but a range of independent checks and balances. As the authors note, this places additional responsibilities onto learners. The process of editing gives credibility to Wikipedia and active engagement with the platform gives users the opportunity to understand what is involved in creating an article and how this is an active, “iterative” process involving engagement and discussion with a wider community. The ecosystem of Wikipedia encourages openness therefore encourages critical reflection and engagement.

As acknowledged by the authors, whilst Wikipedia editing may fulfil the ACRL framework criteria, it is not a panacea with regard to increasing information literacy or addressing social justice issues. As the authors note, Wikipedia is not a perfect community and its policies (such as the ‘neutrality’ policy) can be controversial. As Wikipedia is an OER there is the potential for anyone to converse and engage around these issues. However, as is well known, Wikipedia has historically suffered from a lack of diversity in its editorship. As McDowell and Vetter discuss there is potential for use of Wikipedia to address this. Within the USA context, even one class engaging in Wikipedia editing “...provides an effective and rapid antidote to Wikipedia’s lack of diversity...” both in relation to the demographic of American undergraduates but also in relation to the interests and focus of each editor’s activities. This is also true elsewhere in the world and, as the authors note, potentially applicable to the general public.

The authors conclude with some useful recommendations which reflect the community of care needed to introduce and sustain Wikipedia editing to new and much needed users from diverse backgrounds.

This paper adds to a growing range of research which shows how OER is not just being used to support social justice issues such as access but that the OEP engendered by this type of resource can also be used to develop scholarship in different ways. It highlights the pedagogical importance of engagement with OER such as Wikipedia to do so. Using the ACRL framework to map Wikipedia editing practices is a useful way to showcase the potential of OER and OEP, although the encyclopaedia format is very specific. This paper also highlights the potential for OER ecosystems and platform architecture to do so in a sustainable and community based way.

College student engagement in OER design projects: Impacts on attitudes, motivation, and learning

Trust, T., Maloy, R. W., & Edwards, S. (2022). College student engagement in OER design projects: Impacts on attitudes, motivation, and learning. *Active Learning in Higher Education*. 340. <https://doi.org/10.1177/14697874221081454> / [https://scholarworks.umass.edu/education\\_faculty\\_pubs/340/](https://scholarworks.umass.edu/education_faculty_pubs/340/)

Reviewed by Helen DeWaard (Lakehead University, Canada)

This research explores the creation of open educational resources (OER) by students and faculty in six different higher education course contexts, to learn about and complete assignments applying a problem-based learning (PBL) approach. The authors claim that student engagement with open project development positively impacts learning, that OER production can prepare students for 21st century success, and the use of OER assignments can improve awareness of OER and expand pedagogical knowledge for current and future educators. The authors contend that this exploratory, qualitative research into OER production “not only benefits students in higher education but also breaks down the walls of the classroom to support education on a global scale” (p. 14), and thus establishes a starting point for deeper understanding of PBL as part of an open educational practice (OEP) in higher education.

The description of the six courses is, in and of themselves, worthy of further exploration as examples of how course design can include the production of OER with and by students. Since these are OER productions they are available for use and remix by educators around the world. The PBL designs include a digital media course, the creation of an online tools site, wiki work for history and social studies, creating videos to showcase campus resources, an online course for the development of a professional learning network, and an e-book focusing on digital tools and apps for teaching with technology. While the tasks are focused on the field of education, these types of assignments could be applied to a variety of courses in other fields of study.

In this study, Trust et al., analyse post-course surveys from between 2015 to 2019 for six courses where student assignments and tasks were designed as OER. While the exact questions are not included, the survey question design is described and the survey results are shared in chart and graph formats. As reported by Trust et al. (2022), it is reasonable that the survey design changed to include additional responses about attitude and motivation, since the survey was used over an extended period of time. The survey results were analysed using descriptive statistics and thematic analysis to identify codes and patterns in the data in order to respond to the three research questions relating to attitude and motivation, skills developed, and what students felt they learned from the OER design project.

Interestingly, two of the survey questions were pre-populated with a list of commonly cited 21st century skills identified through analysis of content on websites and journal articles. While the full listing of these choices would have provided additional information, the top ten skills are identified in the tables and graphs. The differences found between each of the six courses provide some interesting observations for course design when students create OER. Noticing that multicultural awareness was significant in the wiki design project suggests that this option would be a good choice for a course where this specific skill is identified as a course objective. Noting that creativity was identified for the online tools site project could indicate that this type of OER design work is beneficial when a course objective focuses on student creativity as an outcome.

The argument presented by Trust et al. (2022) to design courses with student creation of OER is not new, and has been made by advocates of OER and OEP (Paskevicius & Irvine, 2019; Van Allen & Katz, 2020; Wiley, et al. 2017). What Trust et al., (2022) present is the student perspective and perceived impact of OER production on their learning. This well written and accessible offering adds much to current debates about OER and OEP in higher education. This research provides an example for educators and instructional designers looking to integrate OER and PBL approaches within their fields of study or geographic contexts. This research is especially relevant for open education research since it lays out a foundational inquiry examining the impact of OER production on student learning. Not only the survey and research results found within this study, but the examples of course designs involving OER production, are potentially beneficial to those new to the field of open education and student creation of OER.

Trust et al., (2022) conclude that “shifting students’ roles from consumers to curators and designers of OER can positively impact students’ motivation to learn, attitudes about learning, and development of valuable 21st-century skills that will prepare them for life, work and citizenship in an ever-changing future” (p. 14). The data presented in the graphs and charts, and explained in the discussion section, support the conclusions identified. Not only do the survey results show the potential impact of student design of OER, but the tracking of page views and project downloads, as well as the access by a global audience, indicates that the potential for student created OER can expand exponentially.

A qualitative study to understand the perspectives of MOOC providers on accessibility

Iniesto, F., McAndrew, P., Minocha, S., & Coughlan, T. (2022). A qualitative study to understand the perspectives of MOOC providers on accessibility. *Australasian*

*Journal of Educational Technology*, 87-101.

<https://ajet.org.au/index.php/AJET/article/view/6610>

Reviewed by Beck Pitt (The Open University, UK)

As universities report a growing number of learners declaring disabilities, an increasing number of learners with accessibility needs are also studying MOOC. How do MOOC creators and platforms accommodate different learner needs? Whilst understanding learners and their needs is critical to developing and supporting effective learning, there is little current research on how MOOCs currently support different learners. Moreover, as the authors of this paper note, the challenges faced by MOOC creators and platforms are not unique but of wider interest, particularly to those involved in open learning.

In this paper, Iniesto et al. (2022) reveals that compliance with legal requirements informs and shapes MOOC provider responses to accessibility, rather than a systematic understanding and response to learner needs. Through interviews with 26 representatives, in a range of roles and from a range of universities and platforms involved in the development and hosting of MOOC content (including FutureLearn, edX, Galileo University and Universidade Aberta) this paper explores the reasons behind this situation and makes a series of actionable recommendations for those involved in MOOC development and delivery.

As Iniesto et al (2022) reports, whilst MOOC are viewed positively by interviewees and there is awareness of reported benefits for learners who declare a disability, focusing on fulfilling on legal, platform and/or institutional requirements does not account for and centre learner needs. This highlights a need for better collaboration between those involved in the development and production of MOOC, to ensure that accessibility is considered at all stages of MOOC development. When information on learners is gathered, approaches are often inconsistent, incomplete and consequently lead to a limited understanding of learner accessibility requirements. To rectify this, platforms should develop effective ways of understanding learners and their needs, including surveys and the use of learning analytics. Course content should also reflect and be informed by different learner needs. The paper also includes a number of recommendations for platforms to support learners with different needs, including simplifying platform interfaces, improving navigation and assessment options, ensuring that learners without a reliable internet connection can participate easily offline and providing transcriptions and other support for video and audio.

Of note is that the nature of the course itself (e.g. the “open” and “massive” aspects) were considered as important to supporting a variety of accessibility requirements by interviewees. This paper provides a clear steer and set of

recommendations for MOOC creators and platforms to foreground accessibility and develop a more nuanced understanding of, and support for, different learner needs. Limitations to the research, such as MOOC provider representation and possible “self-serving bias” are noted.

#### Assessment of trend and current pattern of open educational resources: A bibliometric analysis

Mishra, M., Kumar Dash, M., Sudarsan, D., Guimarães Santos, C. A., Mishra, S. K., Kar, D., Bhat, I. A., Panda, B. K., Sethy, M. and Marques da Silva, R. (2022). Assessment of trend and current pattern of open educational resources: A bibliometric analysis. *The Journal of Academic Librarianship*, Volume 48, Issue 3. <https://doi.org/10.1016/j.acalib.2022.102520>

Reviewed by Kathy Essmiller (Oklahoma State University, USA)

This purpose of this article is to provide an overview of OER as represented in “scientific literature” (p. 1) from 2002 to 2020, with the additional goal of providing a summary of “the growth structure of OER” (p. 1) in regards particularly to barriers and challenges to its creation and use. Mishra et al. applied bibliometric analysis to data available in the Scopus database responsive to keyword searches including open textbook, open online course, open courseware, open-source software and open social learning. Findings include identification of continuing challenges related to languages in which OER are published, inconsistent funding, quality/awareness, and lack of infrastructure.

#### Transformation and digital literacy: Systematic literature mapping

Farias-Gaytan, S., Aguaded, I. & Ramirez-Montoya, MS. (2021) Transformation and digital literacy: Systematic literature mapping. *Education and Information Technologies* (2021). <https://doi.org/10.1007/s10639-021-10624-x>

Reviewed by Helen DeWaard (Lakehead University, Canada)

Digital transformation and digital literacy are key considerations in higher education, now even more evident with the impact of online and remote teaching and learning resulting from the COVID-19 pandemic. For this reason, the research conducted by Farias-Gaytan et al., (2021) is worthy of attention as it provides a timely and insightful systematic literature mapping of research from 2015 to 2020. This paper opens a window on the global reach of digital transformation and digital literacy as topics of interest for researchers in higher education. Farias-Gaytan et al., (2021) outline a compelling case, as evidenced in the research, that digital

transformation has had significant impact on higher education, with primacy of interest found in the areas of innovation of learning practices and the development of digital competencies (Farias-Gaytan et al., 2021).

One challenge to deeper understanding of this work by Farias-Gaytan et al., (2021) is the absence of an explicit conception of digital transformation and digital literacy. While the Boolean search strings applied by the authors include the terms media literacy, digital literacy, and digital competency, this research focuses more on digital transformations and the resulting issues of integration of technologies into all facets of the higher education sector, and less on digital or media literacies. The authors use the terms media and digital literacy interchangeably throughout the paper yet research shows there are distinctive characteristics that distinguish these terms (Buckingham, 2020; Spante et al., 2018).

The authors apply five categories for digital transformation based on work by Anderson and Ellerby (2018) that includes customer, strategy, technology, operations, and organization and culture. These categories emerge from a business context rather than an educational model so potential gaps in the analysis of digital transformation on teaching and learning, particularly in open educational contexts, are evident. An alternative framework that might better match the higher education sector and still frame the analysis of the research could be the ten dimensions of open education (Inamorato dos Santos, et al., 2016).

While the writing may at times be challenging for those not familiar with terminology and processes used in the research design and analysis (e.g. citation counts or impact factors), one significant benefit of this research is the accessible database of 298 curated articles for open review and examination. This adds significant value to those studying the field of digital transformation in higher education. Additionally, this research adds two analyses of interest to those new to the study of digital transformation in higher education. First, the geographic specific research from research question (RQ) three will help locate local or global collaborators. Second, the citation counts resulting from RQ2 can inform research work that has gained attention in the past five years, making it of some value to current literature searches.

The analysis of research question five and six add the most value to the field of open educational studies, with insights on how digital transformations are classified, and the trends and issues from the field of digital transformation in higher education. Farias-Gaytan et al., (2021) found significant diversity in the literature, and discovered that 75% of the studies made reference to pedagogies that impact users' digital skills. Interestingly, as revealed in Figure 8, very few articles in the literature collection relate to open education. Based on the research analysis, the authors determine that the "development of digital competencies of both teachers



and students contributes to the adoption of new technologies that support the learning process” (Farias-Gaytan et al., 2021, Discussions, paragraph 5) and that digital literacy is promoted when diverse technological alternatives are enabled in educational contexts. Digital pedagogies that impact student and teacher’s digital transformations require organizational strategies that support their adoption, according to Farias-Gaytan et al., (2021).

### Opening up Educational Practices through Faculty, Librarian, and Student Collaboration in OER Creation: Moving from Labor-Intensive to Supervisory Involvement

McGeary, B., C. Guder, and A. Ganeshan. (2021). Opening up Educational Practices through Faculty, Librarian, and Student Collaboration in OER Creation: Moving from Labor-Intensive to Supervisory Involvement. *Partnership: The Canadian Journal of Library and Information Practice and Research*, vol. 16, no. 1, June 2021, pp. 1-27, <https://doi.org/10.21083/partnership.v16i1.6149>

Reviewed by Natascha Chtena (Harvard University, USA)

This article offers a detailed overview of an academic library’s evolving approach toward OER implementation, with a focus on the labor implications for the various stakeholders involved. While it is oriented predominantly toward practitioners in the field, it will be of interest to anyone concerned with questions of cost, (invisible) labor, and long-term sustainability as they relate to library-led OER initiatives.

Taking Ohio University Libraries as a case study, the authors propose a model for transitioning library-led OER initiatives away from labor-intensive activities (e.g., workshop design & delivery, training sessions) to a learner-centered model where library personnel focus on project management responsibilities. The model puts students at the forefront of OER and textbook affordability work, through compensated involvement in OER authorship and post production work, such as proofreading, checking facts and citations, verifying statistics and formatting.

With great transparency and detail, the authors describe several initiatives undertaken by the Ohio University Libraries to encourage OER adoption and use over the years, centering on a grant-funded initiative that provided support services for faculty creating OER, while also enhancing undergraduate education across the institution. This particular grant was awarded by the Ohio University Foundation in 2018 and provided \$20,000 to support the development of five OER projects that have directly involved students in the creation of those materials. Among the projects discussed in the paper are an Hispanic linguistics open textbook created using only student-authored texts, student-generated test banks to accompany existing OER materials for a large-enrollment art history course, and several other

projects in which hired student assistants have helped faculty to develop content for open textbooks.

The authors contend that actively involving students in OER creation has improved student-faculty-librarian relationships and increased student engagement, while also helping foster open educational practices across the institution. According to the authors, the shift away from labor-intensive activities and toward more collaborative partnerships with faculty and students to produce OER projects also helped address barriers to OER adoption and creation faced by faculty, including a lack of time, as well as access to the right technology and the technical know-how to use it successfully.

While the authors suggest that the grant program instituted by Ohio University Libraries can be replicated at other institutions without great monetary investment, their model will likely be most applicable to institutions of a similar size and type as Ohio University, a doctoral-granting, high research university with a total enrolment of 28,770 (as of September, 2021), a well-staffed library, and other campus units providing faculty support (e.g., Academic Technology, the Center for Teaching & Learning). It is also worth noting that the paper does include any program evaluation data or similar measures of impact/effectiveness. Nevertheless, this is a well written case study that includes a solid literature review and offers plenty to chew on for academic librarians seeking to build or expand OER programs, as well as scholars thinking about the role of libraries in OER and open pedagogy.

### Open Educational Resources in virtual teaching communities

Recio Mayorga, J., Gutiérrez-Esteban, P. & Suarez-Guerrero, C. (2021). Open Educational Resources in virtual teaching communities. *Apertura*, vol.13, n.1, pp.101-117. <https://doi.org/10.32870/ap.v13n1.1921>

Reviewed by Ada Czerwonogora (Universidad de la República, Uruguay)

This work is based on the challenge that the digital society demands to respond with a new conception of learning, and to test educational proposals that are open, flexible and adjusted to the needs of students. The access and application of new educational resources by themselves do not generate innovative environments: it is necessary to develop support and counseling strategies to articulate these educational proposals in the classroom.

The research focuses on knowing and analyzing the meaning, uses and potential of open educational resources (OER) in a virtual teaching community (*comunidad virtual docente*, CVD). CVDs were characterized as learning cyber communities (Murua, Domingo & Cacheiro, 2015). Different approaches to OER (Atkins, Brown & Hammond, 2007; Atenas & Havemann, 2014) and OEP (Cronin, 2017) were

surveyed, and also examples of their use in projects and communities. The authors highlight the need to "investigate an emerging discipline, constantly advancing towards an open and flexible education model, in which the use of CVs is increasingly being promoted, and where OER are of special importance" (Recio Mayorga, et al, 2021, p. 104).

The methods section of the paper is quite detailed. The research design was qualitative, describing meanings, uses and potential of OER while trying to understand for what and how teachers use OER. The study focused on Common Open Educational Resources\_STEM virtual community (<http://agrega.educacion.es/>). Two instruments were used for data gathering: semi-structured interviews and a very interesting guide designed for this study, including 34 descriptive and binary (yes / no) indicators. Both instruments were validated in a previous paper (Mayorga, Gutiérrez-Esteban & Suárez-Guerrero, 2018).

The evidence showed that the main subject of interest for the CVD was OER use in STEM. It's a public CVD, with more than 150 members. The CVD's analysis was based on the evaluation guide and its indicators. The results pointed out that modification and OER adaptation were allowed; OER content was divided by authors and members with the highest popularity. Activities including OER for application in the classroom were shared on a monthly basis.

From the coding of the interviews (11 participants), nine main categories were obtained: the reasons for participation in CVD were mostly due to permanent training. The teachers did not participate in other CVs. The themes referred to the development of training courses and the use of OER, innovative experiences, teacher training, science, etc. Feedback was essential for the community. Most considered that the development of classes with OER increased student's motivation. For this reason, the experience and contact with REA were positively valued. The interviewees agreed that the use of OER fostered a more flexible and open teaching process.

The authors considered that this work is an approach to a more complex appropriation process that depends on multiple variables. They agree with Area, Miño, Rivera-Vargas & Alonso (2020), that considering the pedagogical variable in the study of technology in education could contribute to overcoming the bias in research focused on artifacts and their effects. Moreover, it could lead to understanding of policies, subjectivities and practices to build a digital educational praxis. On the other hand, they point out that the difficulty in defining the concept of OER generated a polysemy of terms. Furthermore, the use of OER is not widespread. The contributions and feedback that occurred in these spaces were accompanied by activities related to the subject matter of the courses, where OER

were shared along with guides and didactic units for their integration into the curriculum, as well as examples of sessions for their development in the classroom.

In sum, the use of resources located in CVDs not only involves a technical exercise, but also a professional and social practice, a change in the way of thinking, feeling and doing with technology. It reflects a change in the pedagogical culture, towards a culture that recognizes working openly, as well as modes of participation that go beyond standard or regulated training (López & Bernal, 2016). For the development of open research, it is important to know that this turn will depend on the creation of new open and collaborative learning environments, educational scenarios that take advantage of digitization, and that are significant for the daily life and professional life of the teacher.

#### Open educational practices of MOOC designers: embodiment and epistemic location

Adam, T. (accepted). Open educational practices of MOOC designers: embodiment and epistemic location. *Distance Education*, 41(2).  
<https://doi.org/10.1080/01587919.2020.1757405>

Reviewed by Robert Farrow (The Open University, UK)

The starting point for this study is the observation that Global South countries and institutions are systematically under-represented in the content of the major MOOC platforms. Even though it is a phenomenon widely acknowledged, there is little available research on the impact of Western dominance on the epistemologies of open education. Adam focuses on the “embodied, distributed and situated cognition” (Derry, 2008) which it is claimed is overlooked by traditional pedagogies that deemphasize the importance of language, tradition and cultural knowledge.

Adam’s approach is intersectional, and draws on thinkers from feminism, decolonisation and critical pedagogy. An explicit connection is made between critical reflection and the embodied nature of practice with the goal of drawing out a wider sense of the meaning and potential of openness through reflexivity.

The method used in this study is a series of phenomenological interviews with MOOC designers in South Africa (N=27). Participants were asked about their understanding(s) of openness and how this influences their work as designers. Thematic analysis identifies four categories of experience with concomitant understandings of openness: personal background (broadening the target audience; respecting cultural practices; overcoming stereotypes; acknowledging

one's positionality); academic background; life experiences (disability; privilege); and ideological and political influences. These themes provide a useful index of factors which can focus research on different aspects of embodiment.

The paper concludes with a call to recognise the plurality of knowledge and include marginalised voices in the discourse around open education. The key contribution made is the idea that openness should be understood as an identity and way of being (rather than an approach to learning content or educational practice) and that this should be foregrounded in any attempt to understand openness in education.

One of the central claims of the paper is that Western epistemologies are by their very nature based in a different set of categories than non-Western epistemologies. Therefore, it would have been very interesting to carry out "control" interviews with Western MOOC designers to see whether there were differences in the emergent themes. This might have provided a stronger support for some of the claims made. Though these are hardly universally applied, many MOOC designers are becoming more attentive to embodied interactions as a result of innovations like remote proctoring, universal learning design and theories of embodied learning/cognition. This may indicate a point of convergence which could support decolonisation and reorientation in open education.

**PRAXIS: Open Educational Practices and Open Science to face the challenges of critical Educational Action Research**

Czerwonogora, A., & Rodés, V. (2019). PRAXIS: Open Educational Practices and Open Science to face the challenges of critical Educational Action Research. *Open Praxis*, 11(4), 381-396. doi:<http://dx.doi.org/10.5944/openpraxis.11.4.1024>

Reviewed by Hélène Pulker (The Open University, UK)

This paper presents the findings of an Educational Action Research (EAR) project which explored the potential and benefits of academic Professional Learning Communities (PLC) for the transformation of teaching practices with digital technologies using the Open Science (OS) and Open Educational Practices (OEP) frameworks, in the context of higher education in Uruguay.

The authors claim that this innovative approach of combining EAR and academic PLC with OS and OEP approaches have had a positive impact on the transformation of teaching and educational research practices, fostering reflective practices and OS and OEP adoption, even if this project, they stress, needs to be tested and validated in other contexts and communities.

The research uses a robust Social Network Analysis (SNA) method to analyse the written exchanges from the 30 participants in 127 reflective writing-blog posts including 248 peer comments during a three months teacher training course. The

conclusions are supported by the data. However, it would have been interesting to collect more qualitative data, for example through focus groups, to evaluate the perceptions individual participants had of the EAR and how they believed this innovative combination of EAR, PCL and OEP helped them to reflect and change their own teaching practices with the technology.

Although the results are presented clearly, a summary of the key findings would have been helpful. It would also have been interesting to have a discussion section between the results and the conclusions. For example, in what ways did the EAR combined with OEP and OS fostered academic professional learning, and in what ways did this model differ from reflective practices purely using the communities of practice framework.

The argument to support this innovative research project and the study itself are very well described but there is a lack of argumentation following the results to situate this research project within the wider field of teacher education and professional development in the context of having to adopt open educational practices. Otherwise, the article is well written and reads well, even if, for novices in SNA, the section on results is a little opaque.

The authors claim that such a study combining EAR, PLC with OS and OEP has never been done before, therefore there is no reference to similar studies. However, the frameworks used in the research are very well explained. Perhaps a more comprehensive comparison with the communities of practice framework would have been welcome.

This paper is of particular relevance for the countries and institutions which are on the path to transformation of teaching and educational research practices and may gain from adopting open educational practices and open science through participatory technologies. This paper is also useful as it provides an innovative model for professional development that many HE institutions could replicate and learn from.

Who opens online distance education, to whom, and for what?

Lee, Kyungmee (2020). Who opens online distance education, to whom, and for what?:A critical literature review on open educational practices. *Distance Education*. <https://eprints.lancs.ac.uk/id/eprint/143340/> ISSN 0158-7919 (In Press)

Reviewed by Hélène Pulker (The Open University, UK)

This paper is a critical literature review exploring the current status of OEP (defined in broad terms) in online HE settings through a systematic analysis of 29 scholarly

narratives to establish who opens online distance education, to whom and for what purpose.

It is claimed that the main providers of open education are, on the one hand, individual actors with enthusiasm for openness in education and positive attitudes towards OEP, sometimes supported by technology-driven contributors, such as Apple; and on the other hand universities, divided into four groups: the traditional campus-based universities, the open and distance universities, the Western universities and the nonprofit organizations. The literature review also reveals that universities open education to a large number of beneficiaries with unknown characteristics, and they are sometimes insiders or outsiders in relation to a particular HE institution revealing a blurry distinction between formal and informal learning. OEPs are suggested to be beneficial for populations from extreme sociocultural and political circumstances such as migrant domestic workers or people from developing countries. The paper suggests that, being under increasing pressure to widen participation in their institutions, traditional campus-based universities have participated in the OEP movement to make HE more accessible to the disadvantaged. The author claims that, despite a clear enthusiasm for OEP, there is a lack of clear understanding of the actual purpose for doing OEP across the 29 papers reviewed and notes that, generally, among the traditional campus-based universities OEP seems to be one of those many marginal tasks they need to do to respond to top-down institutional policies rather than to serve the interest of the disadvantaged.

The methods used are robust and appropriate. The search for relevant articles was conducted following a systematic scoping process using Scopus, the largest abstract and citation database. The search, based on titles, abstracts and keywords, returned 137 articles, of which 29 were selected on the basis that they discussed real-life OEP (literature review and conceptual articles were rejected), and that they were indexed in the Social Sciences Citation Index citation database. The narratives in the paper were analysed using a grounded theory approach (Charmaz, 2014) and the Corbin and Strauss (2015) three steps coding method. Although an unusual method for an analysis of papers, the grounded theory approach enabled conceptual categories to emerge from data, rather than initially driven by a theoretical framework.

The data presented as an answer to the question 'Who opens online distance education, to whom and for what?' support the conclusions drawn in the article. The argument is clearly articulated. The paper is written well and reads well.

The papers situates the research in the current debate on OEP, and adds to the increasing body of critical literature on OEP has begun to call for scholars to undertake empirical and contextualised research on OEP, for example Cronin (2017)



and Havemann (2020). Perhaps, in the introduction, there should have been a mention of the Open University (UK) and its social mission to enable the disadvantaged to access HE.

This paper was published in the 2020 Special Issue on Critical Questions for OEP in the *Journal of Distance Education*. It is highly relevant for open education research as it calls for scholars and HE institutions to think about the purpose of doing OEP and it suggests that motives to participate in the OEP movement may be reconsidered as, up until now, it is claimed that the genuine pursuit of the original social inclusion agenda of distance education among open educators has been lost (Lee, 2019).

### Exploring Open Digital Badges in Teacher Education: a Case Study from India

Wolfenden, F., Adinolfi, L., & Cross, S. (2020). Exploring Open Digital Badges in Teacher Education: a Case Study from India. *Journal of Learning for Development*, 7(1), 108-115. <https://jl4d.org/index.php/ejl4d/article/view/383>

Reviewed by Beck Pitt (The Open University, UK)

This paper focuses on the work of the TESS-India project, which aimed to improve teacher pedagogy and practice through co-creation and at scale use of an openly licensed toolkit of resources and an accompanying MOOC. The paper presents the findings from a workshop with educators that explored the possibility of using open badges to recognise successful engagement and completion of localised TESS-India resources for teacher training.

Research on open badging to date has largely focused on the Global North. This paper therefore provides much needed insights into perceptions and applicability of open badging within a Global South context. The paper provides a detailed overview of the group discussions and activity during the workshop, presenting different ways in which participants engaged with learning design approaches to map assessment and accreditation onto their own courses. The approach detailed could be replicated within other contexts; a suggestion which is made by the authors at the end of the paper. Upon reviewing the workshop group discussions the authors identified 4 areas participants felt would motivate learning. These focus on recognition and sharing of achievements both personally and collectively with colleagues, the development of examples of good practice and recognition within the wider context of national frameworks and structures.

Insights into the role of such workshops on teacher educator practice is also highlighted and the authors note a number of shifts including that of more reflective practice or the consideration of diverse methods of assessment. The paper concludes with a variety of potential avenues for further research including the



continued exploration of the potential of open badging for opening up conversations around innovative pedagogy and practice in both the Global North and South.

## Open Educational Resources

### Online Course Development: Creating Robust Educational Experiences Online

Ballantyne, E. & Teaching and Learning Centre, Mount Saint Vincent University (2022) Online Course Development: Creating Robust Educational Experiences Online. <https://caul-cbua.pressbooks.pub/coursedev/>

Reviewed by Marjon Baas (Saxion University of Applied Sciences; ICLON Graduate School of Teaching, Leiden University, NL)

This open textbook is aimed at instructors who will be designing an online course in higher education. The textbook is organised in 10 chapters that focuses on: learners, inclusive pedagogical approaches, course goals, engagement, feedback, learning activities, assessment, content, organisation and balance, and additional support. But before you start with the first chapter, the pre-pages make it really clear that the author thought about relevant side-issues of this OER. She pays respect to the Indigenous custodians of Kijipuktuk (Halifax, Canada), illustrates how accessibility is integrated in the resource's design, and explains how others may use and adapt the open textbook. By doing this, it is already stressed that both the students' and instructors' needs are taken into account. These two themes are also interwoven within the entire open textbook. It starts with creating awareness that there is no such thing as 'one-size-fits-all' education and cultural responsive pedagogy must be part of course developments. It then continues with the different Backward Design aspects of an online course. What is really positive about this open textbook is that the pages are easy to read, there is a nice mix between reading, videos, and images, and there are short exercises that trigger instructors to think about their online course design.

Overall, this open textbook will be very useful for instructors across the globe to prepare them for online course development. It will be of special interest to novice teachers who do not have any experience with course design in general. It will prepare them on what to think about when designing an online course. After reading this book, an instructor will be ready to start designing the online course. That will not be an easy task, but by reading and engaging in this introductory work on online course design they will broaden their perspectives and knowledge on what to think about when designing such courses. A follow-up open textbook, or an extension of the current one, about how to manage a running online course would be of interest as well. Designing an online course and actually running this course online are two different skills, and I think especially novice teachers (but also

experienced 'traditional' teachers) might feel supported if the next step of executing an online course is portrayed as well.

### Encouraging impacts of an Open Education Resource Degree Initiative on college students' progress to degree

Griffiths, R., Mislevy, J. & Wang, S. (2022). Encouraging impacts of an Open Education Resource Degree Initiative on college students' progress to degree. *Higher Education* (2022). <https://doi.org/10.1007/s10734-022-00817-9>

Reviewed by Marjon Bass (Saxion University of Applied Sciences; ICLON Graduate School of Teaching, Leiden University, NL)

This well-written open access research study provides us with a better understanding about the impact of OER degree pathways on students' progress to a degree. The authors argue that prior studies have shown the positive effects of OER adoption on a course level, but the insights into the effect of OER degrees on student learning are still more limited. To investigate the longer-term effect of OER degree pathways, the authors designed a method that is robust and appropriate. Student-level data (e.g. demographics, prior academic achievement, and transcript data) and instructor-level data - included as predictors in the meta-analysis - on experiences regarding teaching with OER were collected within 11 community colleges. Yet, rolling out an OER degree initiative takes time and therefore the researchers were not able to examine students that were enrolled in a full OER degree. While they created three conditions to measure impact of OER on student learning (high, low, no dosage of OER courses), I agree with the stated limitations made by the authors that it would be interesting to explore the full results when students have finished an entire OER degree.

The analysis undertaken by the researchers is explained clearly and the results thereof are presented coherently in the results section. An interesting result is that in 6 of the 11 colleges, students enrolled in OER courses had actually taken more course credits than their peers who were enrolled in traditional courses. No significant effects were found for students taking OER courses leading to a positive impact on their cumulative GPA. However, some groups of students benefit more from OER degree programs than others. The one thing that was unclear when reading this section in the article, was the meaning of the term 'Pell students'. This study has taken place within the USA and this is probably a well-known term there, but lacks a clear introduction in the article for outsiders. Other than that, the results section is easy to read and well supported by figures including descriptive texts. An important statement that the authors make in the results section is that the

conditions and practices within each college could influence whether or not the outcomes regarding OER degree implementations are favourable for student learning. Future research of these authors could explore this in more detail. Additionally, I would especially recommend the authors to include a practical implication section in the article to connect the findings of their study with the practice of OER degree pathways which may support other higher education institutes, OER advocates, and instructors.

### The Journey to Open: A Practical Guide to OER Implementation

Roch, S. and Stracuzzi, A. (n.d.). *The Journey to Open: A Practical Guide to OER Implementation*. Fanshaw College Pressbooks.

<https://openlibrary-repo.ecampusontario.ca/xmlui/bitstream/handle/123456789/1053/JourneyToOpen-PDFPrint.pdf>

Reviewed by Lorena Sousa (Universidade de Aveiro, Portugal)

The Journey to Open presents the process regarding the development and implementation of an Open Educational Resource initiative at Fanshawe College, in Canada, to support faculty and students' teaching and learning. It is divided into three parts:

- Section I: Open at Fanshawe College
- Section II: Team Perspectives and Reflections
- Section III: OER Showcase

In the first section, the process related to the OER Design Studio establishment is presented, including the incubator, design, and adoption processes. On pages 3 and 4, it briefly presents data from a survey that was conducted during the Open Education Days events, but the results do not go deeper. It would be more interesting to have additional details about the questions and percentages regarding students' and faculties' answers. The whiteboard on page 6 is also interesting and a deeper discussion could have been provided, especially on how many people answered it, their background, and if the different colours mean something.

Still in section I, the creation process of the course is presented. The map on page 12 outlines the process and gives a good overview of the general steps. From page 14 to 19, the course is explained, but during the reading it becomes unclear whether the content is from the course or from the guide *The Journey to Open*. On page 20, the OER production framework is very well informed by a workflow,

describing the main steps adopted by the creation of OER. Then, each step is explained on the next pages.

In section II, each member of the team reflects on the process of developing OER during this initiative at Fanshawe College. The data is very rich and relevant to open education research. It describes how the team's concept has changed along the way, the challenges they faced, and the benefits experienced in the process. A suggestion is to use the content analysis method to enrich even more these results.

In section III, the projects produced by the initiative are briefly introduced. More details could have been provided. Final considerations and conclusions of the practical guide are missing.

To sum up, the paper is well structured and presents relevant information to the area of open education. However, some data could have been better analysed and more details could have been explored in order to provide a better overview to the reader.

### Redesigning a Research Methods Course with Personalized, Interactive OER

Wynants, S. A. & Dennis, J (2022). Redesigning a Research Methods Course with Personalized, Interactive OER: A Case Study of Student Perceptions and Performance. *Journal of the Scholarship of Teaching and Learning*, 22(1).  
<https://doi.org/10.14434/josotl.v22i1.31706>

Reviewed by Glenda Cox (University of Cape Town, South Africa)

This research includes results of a survey and a science-based control group investigation of exam results to establish the student learning outcomes when open education resources are introduced into a course replacing a commercial textbook. The authors argue that the strength of OER is in its ability to be remixed and customised resulting in student's positive reactions as the material is more relatable and interactive.

The research takes place at a public institution in the US with a racially diverse student body.

A course was redesigned to include OER, and the chosen OER textbook was extended to include self-quiz items to build weekly online interactive sessions. Exam results were compared where a group of students used a commercial textbook and later with another group who used an OER. The same instructor taught both groups.

This control group method is used in a lot of research. However, there are so many other student and context related variables that cannot be controlled that it is difficult to build a strong argument on the results. The results (as other studies have shown) indicate no significant difference.

The student perception findings are more interesting and useful as there is little research at present capturing a student view of OER. A survey that included open-ended questions provided feedback regarding student's positive experience and satisfaction. The research includes the survey questions and open-ended questions, and this can be useful for future comparative research at other institutions. This paper is clearly written, and the student quotes are a rich source of evidence of their experience in terms of highlights and challenges.

The authors discuss the importance of OER in creating personalised learning which recognises the diverse cultures of students. This localisation aspect together with student feedback and possible future co-creation are suggested as a way forward. The authors future research will investigate the pedagogical changes that academics experience while creating and teaching with OER.

#### Toward a Critical Approach for OER: A Case Study in Removing the 'Big Five' from OER Creation

Joseph, K., Guy, J., & McNally, M. (2019). Toward a Critical Approach for OER: A Case Study in Removing the 'Big Five' from OER Creation. *Open Praxis*, 11(4), 355-367. doi:<http://dx.doi.org/10.5944/openpraxis.11.4.1020>

Reviewed by Kathy Essmiller (Oklahoma State University, USA)

This article describes the results of a single case study research project in which the authors explore advancement of a critical approach to open educational resources (OER) through elimination of the use of proprietary software in OER creation processes and products. Joseph, Guy and McNally state that although critical OER literature has drawn attention to power imbalances, more work is needed to understand how the use of proprietary software interacts in and with those imbalances. Using moral arguments advanced by Stallman (2002) and Waynar (2000), the authors employ a critical lens to analyse how their own OER creation experience would have been transformed without the use of software from Apple, Alphabet/Google, Amazon, Facebook and Microsoft, described in the article title as the 'Big Five'. They found that avoidance of the 'Big Five' did "little to advance a critical approach to OER" (Joseph et al., p. 356).

The study design was a single research case study, and cites literature supporting the design as appropriate for projects seeking deep understanding through the study of individual programs. The case studied was the authors' creation of a series of instructional modules for the University of Alberta's Opening Up Copyright. The article does not include an explicit description of data collection methods used, but the rich description of the context and processes suggest the data was gathered and analysed by the authors as they engaged in creation of the modules and reflected upon their practice. The authors' thorough description of challenges associated with creating the instructional resources without using the 'Big Five' makes clear to the reader why they conclude the cost outweighs the benefit.

In addition to the value the findings of this study have for future open education research regarding the use of proprietary software, scholars will benefit from the literature review, discussion of theoretical foundations, and justification for the use of case study research for similar projects. The literature review presents articles discussing the balance of usability and openness as informed by open source software conversations, sustainability of OER in terms of production support, and the need for increased scrutiny into "social and power relations" (Joseph et al., 2019, p. 357) embedded in the creation, dissemination and use of OER. The authors provide a robust description of the theoretical foundations which informed the critical lens through which they designed and enacted their research. The article includes reference to a number of other single case studies exploring OER, and refers to several works supporting use of single case research studies for projects seeking understanding of processes and meaning.

The authors recommend continued use of critical perspectives for further exploration and study of OER. They recommend that, although "pragmatic arguments exist" for continued use of proprietary software (Joseph et al., p. 363) OER creators remain alert to how such use might exacerbate existing power imbalances.

**Are MOOCs Open Educational Resources? A literature review on history, definitions and typologies of OER and MOOCs**

Stracke, C., Downes, S., Conole, G., Burgos, D., & Nascimbeni, F. (2019). Are MOOCs Open Educational Resources? A literature review on history, definitions and typologies of OER and MOOCs. *Open Praxis*, 11(4), 331-341.  
doi:<http://dx.doi.org/10.5944/openpraxis.11.4.1010>

Reviewed by Caroline Kuhn (Bath Spa University, UK)

The main aim of the article is to discuss if MOOCs (Massive Open Online Courses) should be considered as OERs. This debate is done examining the history and

nature of both OER and MOOCs through analysing different OER definitions and typologies concerning their dimensions and categorisations. This debate leads to a discussion that is focused on their quality for which the authors used the OpenEdQuality Framework. To answer the question, the authors took two perspectives, an OER perspective, where MOOCs as a product can be called OER, and from an open education perspective and innovation, in which MOOCs are going beyond OER as enablers of Open Education and are understood as an innovative way of changing education.

To arrive at their conclusion, the authors analysed different definitions and typologies of OER. After that, they present definitions and usages concerning MOOC's dimensions and categorisation and related them to the standard definition of OER. However, they introduce an interesting third element, namely, the OpenEd Quality Framework, which they used as their theoretical underpinning. The framework is developed by an organisation called the MOOQ Alliance, and it is used as a tool for designers, facilitators and providers to support the benefit of the learners. The quality of the resource, following this framework, relates to the objectives, realisations, and the outcomes of the resource. Although the framework was initially created for MOOCs, the authors considered it suitable to explore OERs, explaining in detail their considerations to do this.

The authors suggest that whether a MOOC is considered a type of OER will depend on the perspective taken, that is, either as a resource or as a learning innovation. If they are considered as a resource, MOOCs could be considered to be a category of OER, but it will depend on the intent of the educational intermediary. If it is taken as open learning innovation, MOOCs transcend the OER category and have the potential to enable innovative learning processes and experiences. What is more, and I consider, highly interesting, is that MOOCs can be seen as more than just resources and be transformed into learning opportunities and environments for self-regulated and collaborative learning.

This paper can be useful for designers and learning instructors that are thinking of using MOOCs in their learning experience. I also think that the introduction of the framework can be highly relevant for those who evaluate MOOCs or OER before they make their decision to integrate them in the learning experience. Having a concise history of both OER and MOOCs in one place is also helpful for those researchers interested in this.

Current state of open educational resources in the Arab region



Tlili, A., Jemni, M., Khribi, M.K. et al. (2020). Current state of open educational resources in the Arab region: an investigation in 22 countries. *Smart Learning Environments*, 7, 11. <https://doi.org/10.1186/s40561-020-00120-z>

Reviewed by Kathy Essmiller (Oklahoma State University, USA)

This article presents and discusses results gathered from a survey investigating the current state of Open Educational Resources (OER) in the Arab region. The research design included a survey adapted from existing questionnaires and validated by OER experts from the Arab League Educational, Cultural and Scientific Organization (ALECSO) and the Smart Learning Institute of Beijing Normal University (SLIBNU). The survey investigated perceptions of OER, use of OER, how OER had been empowered through “initiatives and policies” (Tlili et al., 2020, p. 3), and the accessibility of OER for Arab students. The authors found that OER progress in the Arab region is uneven, describing the region’s OER adoption and use as “still in its infancy” (Tlili et al., 2020, p. 12), and recommend increased use of OER in the Arab region to address social justice issues and improve student learning outcomes.

Conducted as a partnership between ALECSO and SLIBNU, the study aimed to “promote social justice and facilitate OER adoption in the Arab region” (Tlili et al., 2020, p. 3). ALESCO distributed the questionnaire to the Ministry of Education and Higher education of 22 Arab countries as well as to individuals listed in the ALESCO OER database as having expressed interest in the use and adoption of OER. Having received seven hundred thirty-five completed questionnaires from 21 countries, the authors were able to generalize their findings to the Arab region overall.

Questions investigating the perceptions of those in the Arab region regarding OER showed a high level of awareness regarding the role of OER in improving learning outcomes, but that perceived difficulties associated with the creation and use of OER act as a barrier to its use. Those difficulties included limited availability of Arabic content, lack of integration with structured educational practices, lack of time and resources necessary for the adaptation and creation of OER, and the need for improved awareness of open licensing. Participants perceived government support of OER use, but identified a lack of vision and the “absence of strategies or models” (Tlili et al., 2020, p. 9) as issues inhibiting sustainable OER development and use. Additionally, responses indicate that participants perceive that both awareness of appropriate content and ICT infrastructure pose challenges for the accessibility of OER in the Arab region.

This study is valuable for those seeking research-informed recommendations for how to strengthen OER progress in terms of OER perceptions, use, initiatives and policies, and accessibility to address social justice issues and improve learning outcomes. The authors provide a breakdown by percentage of answers to the survey questions, and present the data in easily interpreted graphical form. The

paper provides insight into reasons informing the study itself, as well as information about organizations which support and advocate for the use of OER in Arab countries, effectively helping fill the existing gap in information about the use of OER in the Arab region.

## Open Educational Resources - Impact

### A Study of STEM Usage & Perceptions of OER at a Large Research University

Bharti, N. & Leonard, M. (2021). A Study of STEM Usage and Perceptions of OER at a Large Research University. *International Journal of Open Educational Resources*, Vol. 4, No. 1.

<https://www.ijoer.org/a-study-of-stem-usage-and-perceptions-of-oer-at-a-large-research-university/>

Reviewed by Paula Cardoso

This paper presents and discusses results gathered from a survey investigating the current state of Open Educational Resources (OER) at an American research University. From the perspective of academic librarians, the authors argue that the use of OER may help the curriculum and research of an institution. Thus, they conduct a study on the usage and perceptions of OER within the context of STEM faculty, researchers and students, as the first step of an institutional strategy to establish OER initiatives on campus.

The survey investigated perceptions of OER and user experience in using open educational resources for teaching and/or research initiatives. The authors found that the importance of OER is already recognised, although a big part of faculty and students in STEM are not aware of OER content and access and do not know that OER collections are available through the institutional libraries. Thus, there is a good opportunity for the libraries to choose the path to go towards contributing to the institutional mission through the support of OER initiatives.

This paper confirms what previous studies have already concluded, namely that the lack of time and unfamiliarity of content are two of the most common potential barriers to the lack of OER use by faculty in teaching and learning activities. When it comes to research, the use of OER increases, particularly when it comes to the use of open access articles. Regarding potential benefits, the study also confirmed previous research, when it concludes that the main advantage for the use of OER is its cost-effectiveness.

This study is valuable for those who seek to further understand OER perceptions, use and challenges among the community, as well as the important role that academic librarians can have in developing an institutional campaign to support the development of OER initiatives.

Open To What? A Critical Evaluation of OER Efficacy Studies

McDermott, I. (2020) Open To What? A Critical Evaluation of OER Efficacy Studies. In the Library with the Lead Pipe [https://academicworks.cuny.edu/lg\\_pubs/129/](https://academicworks.cuny.edu/lg_pubs/129/)

Reviewed by Natascha Chtena (Harvard University, USA)

This paper is a non-comprehensive literature review on the state and limitations of OER efficacy research, with particular focus on issues of cost and access, pedagogical practice, and academic labor. The conceptual lens adopted here by McDermott is that of critical pedagogy as defined by Paulo Freire in *Pedagogy of the Oppressed* (1968) and bell hooks in *Teaching to Transgress: Education as the Practice of Freedom* (1994). In a nutshell, critical pedagogy is an educational philosophy that views teaching as a political act. McDermott notes that OER have “have radical potential as transformative tools for critical pedagogy” but, if thoughtlessly employed, they risk serving as “a cost-free version of the status quo.” This is an important point that has yet to penetrate mainstream discussions on OER and open textbooks, particularly in the United States, where the author lives and works.

Drawing on a series of studies published in North America between 2008 and 2019, McDermott argues that existing research paints an incomplete picture of how OER are adopted, developed, and sustained in higher-ed by overlooking the political economy of OER creation and implementation, by overstating the financial benefits of OER, and by failing to properly examine the pedagogical choices driving OER initiatives. “Measurables like student outcomes”, McDermott states, “are too often foregrounded to appeal to administrators and funding organizations.” It is worth noting that, while McDermott uses critical pedagogy as a lens to analyze select studies in OER efficacy, this review is not concerned with how critical pedagogy is used in specific OER textbooks or learning materials. Instead, he analyzes these studies for evidence, or lack thereof, of critical approaches to OER adoption and survey design as it relates to cost and access, pedagogy, and academic labor. His goal is to make explicit subjects indirectly addressed, if not ignored completely, in the existing literature.

The methods are scarcely described and the findings not quantified, which is neither surprising nor damning considering that the paper’s argument is anchored in humanistic social science. According to the author, the studies, reports, and articles selected for this review were drawn mostly from open access journals and websites, though articles from the following databases and search engines were used: Education Resources Information Center (ERIC), Library and Information Science Source (EBSCOhost), Education Source (EBSCOhost), and Google Scholar. Although quantification was clearly not the goal of the analysis, it would have been nice to know the exact number of studies included in the review, as well as the rationale behind the academic database/ search engine selection.

The review's findings are presented across three sub-sections, organized around the following themes: (1) Cost Reduction, Increased Access, and Student Outcomes, (2) OER and Pedagogy, (3) OER and Academic Labor. Key points made by McDermott are that OER efficacy studies rarely engage with and/or interrogate the pedagogical specifics of OER implementation—for example, the pedagogical characteristics of particular OER and the commercial textbooks they replace, or the ways in which OER intersect with pedagogical theories or faculty/student/staff collaborations; that the literature lacks transparency when it comes to the cost savings of OER; and that few studies detail the personnel involved or the costs required for OER initiatives. The paper concludes with suggestions for how to utilize critical pedagogy for future studies and grassroots OER initiatives.

Although not a systematic review, this paper identifies several empirical and conceptual gaps in the literature on OER. It will be of great interest to those engaged in thinking about the politics of learning and how they intersect the OER, although it should be read especially by scholars whose work centers on quantitative studies of efficacy and effectiveness.

### Role of Open Educational Resources to Support Higher Geoscience Education in India

Verma, O. (2021). Role of Open Educational Resources to Support Higher Geoscience Education in India. *Journal of Geosciences Research*, Vol. 6, No.1, January, 2021.

[https://www.researchgate.net/profile/Omkar-Verma/publication/352256159\\_Role\\_of\\_Open\\_Educational\\_Resources\\_to\\_Support\\_Higher\\_Geoscience\\_Education\\_in\\_India/links/60c0bb894585157774bf6e48/Role-of-Open-Educational-Resources-to-Support-Higher-Geoscience-Education-in-India.pdf](https://www.researchgate.net/profile/Omkar-Verma/publication/352256159_Role_of_Open_Educational_Resources_to_Support_Higher_Geoscience_Education_in_India/links/60c0bb894585157774bf6e48/Role-of-Open-Educational-Resources-to-Support-Higher-Geoscience-Education-in-India.pdf)

Reviewed by Anuradha Peramunugamage

Verma emphasizes that India is a vast and diverse country endowed with geo-resources but frequently challenged by a diverse array of geo-related hazards and identifies the need for geoscience specialists with the evidence of literature to discover geo-resources, assure their long-term sustainability, and address geoenvironmental problems. Further identified the importance of geoscience education for the country's overall prosperity. The establishment of the Centre for Online Education at the Indira Gandhi National Open University (IGNOU) in 2004 was one of the country's first steps in this direction, marking a watershed event in the country's educational history. Currently, this collection includes self-learning resources for around 227 IGNOU programs, including geology, geography, and environmental sciences, among others.

The Department of Higher Education, Ministry of Human Resource Development, has collected information on learners' enrollment and successful completion in two master's degree programs in geoscience education, one in geology and one in geophysics, from 2011-2012 to 2018-2019. The findings of the data analysis are rather fascinating. Researchers examined data on learners' enrollment and successful completion of two master's degree programs (geology and geophysics) from 2011-2012 to 2018-2019 and discovered that approximately 41 percent of learners successfully finished these programs throughout this time period.

The paper summarized the inadequate subject-specific knowledge of the candidates, which has been seen during the recruiting process over the last several years, with individuals scoring 30 to 40 percent on the written examination before being invited to appear before the selection committee for final consideration. Researchers mentioned numerous reasons for this performance, some of which are as follows: many learners receive their first exposure to geoscience education at the bachelor level, learners come from a diverse range of socio-linguistic and economic backgrounds, there is a scarcity of faculty, there is an uneven distribution of specialized faculty, and learners have limited exposure to field- and laboratory-based curricula, among others. However, proper analysis or evidence is not mentioned. Also, as mentioned there are a few publications on geoscience education published by Indian writers. The vast majority of learning materials, which include textbooks and practical guides, that are recommended as learning resources for various courses in geoscience education programs are of foreign origin.

Verma found that the teaching-learning community has a problem due to the scarcity of low-cost textbooks, practical manuals, and field guides/manuals in geoscience with an Indian provenance. In this context, developing geoscience educational resources as OER will be beneficial in terms of providing educational material for learners and teachers, as well as facilitating effective teaching and offering up-to-date course content. Additionally, it shows that the OER enables researchers to transform their work into educational resources that will assist geoscience faculty in revising their courses to incorporate emerging fields of geoscience, designing new interactive laboratory experiments, and gaining a better understanding of geoscience teaching practices.

#### Open educational resources in public administration: a case study in Greece

Mikroyannidis, A. & Papastilianou, A. (2021). Open educational resources in public administration: a case study in Greece. *Open Learning: The Journal of Open,*

*Distance and e-Learning* (preprint).

<https://doi.org/10.1080/02680513.2021.1950526>

Reviewed by Viviane Vladimirschi

This paper describes the challenges faced by the public sector in terms of lack of openness and its impact on training and resource use for educational purposes in Greece. While the authors underscore the several advantages and benefits for open educational resources (OER) uptake in this closed context, existing obstacles hinder adoption, reuse, and adaptation for expanding and enhancing curricular and resource sharing for stakeholders. The authors advocate that OERs hold the potential to expand and enhance curricular and resource sharing in public administration and to this end training is necessary. To train civil servants for OER use, the National Centre of Public Administration and Local Government (EKDDA) was selected. EKDDA currently delivers vocational training to over 650,000 Greek public servants and has spearheaded an OER initiative for engaging civil servants.

The authors used a case study methodology to investigate the impact training on OER use would have on civil servants. The case study consisted of offering stakeholders training on the SlideWiki platform. A team of instructors and trainers from EKDDA provided training to trainees on platform use and OER use via online, blended and face-to-face courses. The pilot courses followed Salmon's (2004) 5-stage model of teaching and learning, which are geared towards providing learners skills to become self-regulated learners; increasing team maturity, and undertaking collaboration and co-creation activities. The methods used enabled learners not only to experience different learning modalities but also hands-on experience with the production OER. Artifact creation and collaborative co-creation are paramount to OER production thus the methods used were robust and appropriate in this context. Finally, this study can be easily replicated, and the method is clear and thoroughly described.

The authors used both quantitative and qualitative surveys to evaluate acquired knowledge and skills; learning achievements; and learning reactions that included the usefulness of the training, learners' satisfaction with the training, quality of the learning materials and improvement of overall knowledge. The SlideWiki platform was also evaluated. Overall impact of the training program was assessed two months after the end of the training program. Findings from the evaluation phase are presented in a clear manner through use of graphs, numbers, pie charts and descriptive statistics, which provide support to the conclusions drawn. The authors did a good job at clearly articulating the argument by highlighting the positive impact OER use has on the much-needed collaboration between public sector employees and the need for such training courses to offer them new knowledge

and skills. This collaboration may lead to the expansion and enhancement of curricular and resource sharing in public administration.

Overall, the presentation is well-organized. The article possesses high ease of readability and is accessible to laypeople. While the authors use a wide range of references to back up their study, it would be useful for readers if other studies involving training of civil servants for OER use in this same context had been included for comparison and contrast purposes. This article adds knowledge to extant literature on training public servants for OER adoption and use. The topic of training the public sector to engage in open educational practices is quite complex due to the lack of openness, a culture of collaboration, transparency and existing policies and laws that govern this sector. Hence, the findings of this study do have the potential to contribute to the open education field.

### Open Educational Resources in Italy

Nascimbeni F. (2020) Open Educational Resources in Italy. In: Huang R., Liu D., Tlili A., Gao Y., Koper R. (eds) *Current State of Open Educational Resources in the "Belt and Road" Countries*. Lecture Notes in Educational Technology. Springer, Singapore. [https://doi.org/10.1007/978-981-15-3040-1\\_4](https://doi.org/10.1007/978-981-15-3040-1_4)

Reviewed by Viviane Vladimirschi

This article discusses the current state of art of OER in Italy in both higher education and basic education sectors. It also provides a brief description of the Italian copyright law and its limitations and challenges (i.e., lack of policies for OE and OER uptake), which impact widespread OER adoption and use across all Italian educational sectors. Finally, the author provides suggestions and recommendations for implementing a national policy and specific actions aimed at capacity building, providing incentives and the development of a meta-platform to increase and foster OE and OER uptake in the Italian educational sector.

The method used is appropriate as it provides the reader with an in-depth view of the current state of OER uptake in Italy. The researcher conducted a thorough literature review and included key issues such as funding and undertaken actions and initiatives geared towards promoting the use of OE and OER at three main levels: the macro level - national and regional policies- the meso level- invested stakeholders' networks and communities- and the micro level – single institutions and specific OER projects. The researcher also included data amassed from a survey carried out by the Italian Conference of Rectors. This survey was focused on understanding stakeholders' readiness and willingness to innovate educational practices via the adoption of OER.



The literature review and survey results provide relevant data that support the conclusions drawn. It is evident the researcher carried out a comprehensive investigation to back up the research claims advanced by the paper and to provide readers with a detailed understanding of the inherent challenges and opportunities regarding OER uptake in Italy. The researcher's knowledge and familiarity in the field of OE and OER are unquestionable and do indeed clearly articulate all arguments put forward. Particularly in the last section of the paper "Discussions and Conclusions" the researcher sheds light and addresses important factors that would help overcome several challenges related to OER adoption and use at the policy level and in practical implementation actions across the Italian higher education and basic education sectors. These arguments strengthen the need for policies, capacity building, awareness-raising and mechanisms that incentivize such practices.

Overall, the presentation is very well-organized. The article possesses high ease of readability and is accessible to other researchers in the field that face similar problems related to the adoption and use of OER in their countries. This paper adds knowledge to the current state of OE in Italy. It is an excellent resource for researchers from other countries to compare the progress of their current OER developments and achievements. The paper also presents some invaluable suggestions and practical implementation actions, which could be implemented by other OER researchers and/or advocates according to their specific contexts and available resources. Thus, the findings from this paper have the potential to contribute to the open education field since they not only underscore existing challenges faced by most countries in terms of OER uptake but also bring to the table possible solutions to overcome these challenges.

#### Incentivizing faculty for open educational resources (OER) adoption and open textbook authoring

Todorinova, L. & Wilkinson, Z. T. (2020). Incentivizing faculty for open educational resources (OER) adoption and open textbook authoring. *The Journal of Academic Librarianship*, Volume 46, Issue 6. <https://doi.org/10.1016/j.acalib.2020.102220>

Reviewed by Paula Cardoso

In this paper, Todorinova & Wilkinson (2020) explore the adoption of OER by faculty at an American University. The driving force behind the research was the concern with the costs of university textbooks and the leit motiv was, thus, to promote the affordability of textbooks and relieve students' financial burden.

The authors assessed the experiences and perceptions of faculty who had participated in an incentive-award programme in place at the university, to promote affordable course materials, among which Open Educational Resources (OER). The

survey also explored faculty knowledge and use of OER, besides their interest and perception of received support to implement the programme, in order to inform future programme development.

The literature review conducted by the authors builds on the benefits, barriers and challenges in OER adoption in the teaching and learning process in higher education, from the lens of a textbook affordability incentive programme.

Within the limitations of presenting a small sample, due to the limited number of participants in the institutional programme, the results show that faculty responded well to the programme and, in general, felt that students benefitted from having an instructional experience based on redesigned course materials.

Despite the positive impact most faculty identified in the programme, results show there are challenges at several levels. On one hand, faculty reported a general inability to find materials that would always suit faculty's needs, but, at the same time, had no particular interest in creating OER or in authoring open textbooks. On the other hand, faculty reported departmental support in developing innovative practices and pedagogies, but not necessarily concerning OER.

Although the paper had the objective of assessing the implemented institutional programme, the authors may take the opportunity of using the research results to further develop the programme in a way to provide specific training on OER authoring and, simultaneously, to adopt different triggers and incentives for faculty at different stages in their career.

Most research on OER adoption by faculty focuses on a bottom-up approach, where OER pioneers and champions usually implement their practices and motivate others to do it. The relevance of this paper is that it brings a top-down approach and studies this perspective to implementing an institutional strategy.

## Open Educational Resources - Theory

The (Scientific) Digital Culture / (Wissenschafts-)Kultur der Digitalität

Lasch, A. (2021). The (Scientific) Digital Culture / (Wissenschafts-)Kultur der Digitalität. Lessons Learned. Vol. 1 No. 1/2. <https://doi.org/10.25369/ll.v1i1/2.27>

Reviewed by Robert Farrow (The Open University, UK)

This short article focuses on the idea that digital culture [Kultur der Digitalität] is often seen as a disruptive element by universities, and argues that instead we should see continuity between the traditional and digital aspects of higher

education. Lasch refers to Stalder (2019) in describing the three elements of digital culture as Referentiality (knowledge may not be hegemonically owned and this is accelerated by digitalisation), Commuality (epistemic communities are communities of practice) and Algorithmicity (machines are increasingly able to undertake tasks previously reserved for humans).

Each of these can be understood to have their own internal conflicts with respect to being closed/open. Lasch argues that these come to the fore with questions around how people participate in universities; how transparent and visible their activities and outputs are; who has access; and how value is created by activity. Openness can therefore be understood to cut across all of these critical questions.

The next section of the paper explores three projects relating to digital culture: the Lingdrafts (project) blog; the promotion of open educational resources by a group of organisations in Germany; and collaborative approaches to pedagogy as an open educational practice. The common idea here is that "Openness cannot be prescribed. Openness must be worked out together." This notion is elaborated in the final section with reference to the forthcoming virTUos project which proposes an agile, innovative, university-wide and interdisciplinary approach to pedagogy.

While there is not enough space in the paper to properly examine all the underlying claims, this concise paper does a good job of explaining how the relationship between openness and digital culture can be understood as an encompassing dialectic. The strategic vision is articulated well and likely to be of interest to those focused on how higher education institutions may move in the direction of openness.

#### A Response to Rising Textbook Costs Difficulties in the Transition Process to OERs Through the Lens of Mezirow's Theory of Transformative Learning

Rambow, A. (2021). Open Educational Resources (OERs): A Response to Rising Textbook Costs Difficulties in the Transition Process to OERs Through the Lens of Mezirow's Theory of Transformative Learning. In Gabellini, C., Gallner, S., Imboden, F., Kuurstra, M. & Tremp, P. (edit) *Lehrentwicklung by Openness – Open Educational Resources im Hochschulkontext*. Pp.71-75

[http://www.sfdn.ch/wp-content/uploads/Lehrentwicklung\\_by\\_Openness\\_OER\\_im\\_Hochschulkontext.pdf#page=71](http://www.sfdn.ch/wp-content/uploads/Lehrentwicklung_by_Openness_OER_im_Hochschulkontext.pdf#page=71)

Reviewed by Glenda Cox (University of Cape Town, South Africa)

The researcher set out to understand selection quality criteria for OER and identifies this as an unknown area that needs to be explored in United States (US) undergraduate courses. Peer assessors and course reviewers were interviewed from Quality Matters, an organisation in the US that assesses online and blended courses.

Purpose, ease of use and content seem to be the three pillars of quality and are addressed in the research questions. According to this qualitative study OER improved the quality of online learning, instructors looked for OER from preferred sites like MERLOT, American Yawp and OpenStax. Overall participants rated OER positively and said they were not only about cost but also relevance and current information.

The author uses Mezirow's Theory of Transformative Learning. Mezirow's theory is used to frame each step of the journey from using traditional closed materials to using OER to the point of making a paradigm shift. The argument is made that these experienced OER practitioners have moved through all 10 stages of transformative learning.

A qualitative methodology is used. A sample of 16 course instructors were interviewed. This is a case study of a very specific group with similar perspectives. The author wanted to understand more about the quality of OER. The research questions could have dealt more specifically with quality and change of practice (transformation). The questions were nevertheless very interesting about purpose, ease of use and content of OER.

The argument about a shift in practice being a complex process is explored well with the use of Mezirow's transformational theory. This theory has been used by Stacey Katz and it is tested out again here to establish shifts in values of those who were interviewed. I wonder if it will be useful to apply this theory to instructors who are new to OER or perhaps those who have created or used one OER and then not continued the practice. Perhaps the Stage at which the transformation is blocked can be identified.

The article is brief but is a well written summary of a clearly much more detailed study. It is important in making a case that OER improve online materials. A main reason for this is that materials are available one and there is no waiting to purchase and expensive textbook. The paper concludes with a section on implications for leadership who should consider saving cost for students and encouraging instructors to use OER on an institutional level.

### Open Education Resources: Supporting Diversity and Sharing in Education

Ramoutar, S. (2021). Open Education Resources: Supporting Diversity and Sharing in Education. *TechTrends* 65, 410–412. <https://doi.org/10.1007/s11528-021-00615-7>

Reviewed by Paula Cardoso

This paper presents a brief evolution of the concept and theory of Open Educational Resources (OER), since its origins to a few considerations around the future of OER.

By analysing a few of the most important references and authors in the field, the author traces a short but consistent path of the OER movement. It starts with its initial definition and explains how it has evolved into an established concept, from its roots on Learning Object Development and open content. Then, the author moves into a very brief overview of the main OER initiatives, with a focus on online resources available via online platforms and online repositories across the globe. An important aspect is that it provides examples of current research on the impact and advantages of open pedagogy, not ignoring the cultural context around OER and the political and institutional practices that support it.

Although this is a theoretical article, it is well written and clearly articulated, providing a good source of relevant research, which becomes important to systematize and advance open education research.

## Open Pedagogy

Critical data literacy in higher education: teaching and research for data ethics and justice

Atenas, J., Haveman, L., Kuhn, C. and Timmermann, C. (2022) Critical data literacy in higher education: teaching and research for data ethics and justice. In: *Data Cultures in Higher Education*. Springer. <http://oars.uos.ac.uk/2348/>

Reviewed by Kate Huth (Griffith University, Australia)

The authors of this chapter are quick to introduce the reader to the idea that the modern world of Higher Education contains a lot of data, furthermore that this data takes a wide variety of skills to both work with and understand. Their stated purpose is to address some questions about how ethics and the use of ethics as a research method can work on addressing bias in data, in the collection, analysis and interpretation of data, as well as in how it is used. They call for educators and researchers alike to explore the issues of data literacy by using research based activities from a social justice perspective.

Part of how they do this is by using a case study of a course run in Uruguay which was part of a larger study. However, most of the chapter tries to introduce a greater

understanding of data, bias in data, data literacy, and ethics as a method of research.

The discussion of the case study itself is well written and easily comprehensible. The study was looking at a specific course operated online over 2 semesters. The course required students to reflect on the politics of data and intersection of different social dimensions (race, gender, ethnicity).

The project itself was designed using the research-based learning model. Those in the course had to critically define a problem related to data and propose a solution based on the content learned in the course. Positive feedback was received from participants based on content, resources, practical case studies, reflection activities and activities that could be taken to the classroom.

This section supported the arguments put forward by the authors and gave some insight into how different forms of OER can be used successfully in a variety of contexts.

The biggest and most consistent idea put forward by the authors is that data should not be considered to be benign. They are looking at data as a living thing – it is not static. Even as it is observed, it changes. Data is collected but then analysed, interpreted, and communicated. At each of these points, the authors show us, data is constructed.

There is a lot more information in the lead up to the case study, which is the basis of the research, however what was there left me looking for more. The information felt incomplete as several of the “big ticket” ideas were never fully explained.

The authors want readers to take a critical approach to data literacy. They want learners and educators to take into consideration questions of social justice and pluralistic values while using data to work towards the mitigation of pervasive social injustices. They want researchers to use ethics not as a guide but as a research method. All of these things they tell us.

What wasn't said, or wasn't articulated in a manner that I was able to understand, was what they meant by some of these things. The authors decry the concept of “commonsensical understandings” and yet they rely on them for key parts of their own message. The one key term that was used frequently but never defined, instead the authors rely on a common understanding, is social justice. Given that this concept forms the basis of their argument along with critical thinking (very well defined), and data ethics (very well defined) a definition of what the term means in this context would have supported their arguments.

## The why of open pedagogy: a value-first conceptualization for enhancing instructor praxis

Werth, E., Williams, K. (2022). The why of open pedagogy: a value-first conceptualization for enhancing instructor praxis. *Smart Learning Environments* 9, 10. <https://doi.org/10.1186/s40561-022-00191-0>

Reviewed by Emily Helton (West Virginia University, USA)

This article seeks to address the gap between theory and practice in open pedagogy by connecting unfamiliar instructors to open techniques that align with their existing values, namely: transparency, sharing, personalised learning, learner empowerment, deconstructing traditional power structures, and collaborative knowledge construction. They include a table and a graphic that shows how subject matter experts evaluated the presence of each of these values in four aspects of open pedagogy: open design, open content, open assessment, and OER-enabled pedagogy (with the latter receiving high marks in all values). They named this the Values-First Framework (VFF). Their argument is that by starting with the motivation of a naive instructor, the VFF should make it easier to find entry points into open pedagogy.

In developing the values, the authors espouse a hermeneutical approach, citing the Stanford Encyclopedia of Philosophy (Zalta, 2022). Not being particularly familiar with hermeneutics, I would have appreciated a more thorough description, however the table they refer to (Table 1), includes a very helpful list of references and conceptual terms associated with each of their six values. In particular the conceptual terms could be useful in conducting literature searches.

Their data consist of an electronic survey collected from nine subject matter experts (SMEs). They selected 12 individuals who had published in peer-reviewed journals about open pedagogy, and all but three agreed to participate, representing the United States, Canada, South America, the UK, and the Middle East (p 13). They asked the SMEs to select which of the six values was evident in each of the four aspects of open pedagogy. None of the SMEs requested definitions for the four aspects. They report these results in a heat-map style table, where any value-aspect combination that received more than six votes is color coded. Values range from four to nine, with nine indicating agreement from all SMEs (occurring six times out of the 24 possibilities).

The language is clear throughout, and I find this to be a very accessible piece. Much of the literature review focuses on the lack of clear definitions or definitional

consensus within the broad umbrella of how OER is used in educational settings, before settling on Nascimbeni and Burgos' (2016) Open Educator practices as the foundation for their work. There is a lengthy bibliography that includes much of the research on open pedagogy and related concepts.

Overall, I like the idea of a framework that would help educators interested in, but not yet implementing, open pedagogy connect with specific places to start. The final table in the piece (Table 4) gives a few citations for each of the four aspects as a jumping off point for educators to get started. Presumably, they would read the article, identify their values, then pursue those citations. I could see this being shared with colleagues who express interest in open pedagogy.

#### Teaching German as a Foreign Language with Open Educational Resources (OER): Implementation in and Experiences from an Indonesian University

Wijayati, P. H., Kharis, M., Hidayat, E., Ardiyani, D. K., Ebner, M., & Schön, S. (2022). Teaching German as a Foreign Language with Open Educational Resources (OER): Implementation in and Experiences from an Indonesian University. *International Journal of Emerging Technologies in Learning (iJET)*, 17(04), pp. 225–238. <https://doi.org/10.3991/ijet.v17i04.23225>

Reviewed by Paula Cardoso (Instituto Politécnico de Leiria, Portugal)

This paper is an interesting effort to describe OER use in Indonesia, as there aren't many studies in this particular context, specifically when it comes to language learning. It provides a description of the implementation and use of OER in the context of German as Foreign Language in an Indonesian University. However, the paper presents several weaknesses, both in terms of relevant research and method, as well as the conclusions drawn.

On one hand, references are missing when it comes to several issues specific to OER. For instance, although the authors acknowledge that "OER seems not to be very widespread in language learning", more references are necessary regarding this use, for the paper to be stronger both in theoretical assumptions as well as in the methods used. Also, terminology is not always clear and needs further development, as in "OER of the MOOC type".

On the other hand, the methodology doesn't clearly identify the source of OER (Internet pages are referred to as a general reference). The criteria to find and select



suitable OER are not described nor is the implementation clear, as it is not possible to understand what students are required to do with the OER materials or how they are incorporated. Furthermore, it is unclear what the authors mean when they say that other materials were used, that were not OER, but freely accessed. The benefits for lecturers are not quite clear and for students they are not mentioned at all. For a stronger paper on the subject, the advantages of OER for language learning need to be further explored,

The authors initially claim that there is a shortage of OER for language learning and identify this as a major obstacle to the use of OER. However, in the discussion part of the paper, the authors refer that they “have found that there are abundances of OER for German language learning on the Internet”.

Regarding the results section, the authors mention that the results are in line with other studies when it comes to the lack of quality of OER, but throughout the study, this factor is never referred to. They do, however, mention that, despite finding OER, lecturers still had to make them suitable to their needs, and this is implied as a weakness of OER, instead of one of its benefits, that is the possibility to remix and repurpose materials.

The research objectives could also be more aligned with the effective study, in order to include lecturers’ perceptions on OER use.

There is an interesting attachment which identifies all the OER and their source and is also shared as an OER, so it provides a useful contribution for the identified shortage of materials in this field.

### Learners’ Perception of the Transition to Instructor-Led Online Learning Environments: Facilitators and Barriers During the COVID-19 Pandemic

Kamble, A., Gauba, R., Desai, S., & Golhar, D. (2021). Learners’ Perception of the Transition to Instructor-Led Online Learning Environments: Facilitators and Barriers During the COVID-19 Pandemic. *The International Review of Research in Open and Distributed Learning*, 22(1), 199-215. <https://doi.org/10.19173/irrodL.v22i1.4971>

Reviewed by Anuradha Peramunugamage

The purpose of this study was to ascertain the reactions of traditional face-to-face learners at Savitribai Phule Pune University, India, to the abrupt shift to online learning in March 2020 as a result of the pandemic, as well as the effect on their learning. In light of the COVID-19 epidemic, the authors investigated traditional

learners' perceptions of online learning and its acceptance in India. The research investigated the phenomena through the use of a qualitative case study. The study examined learners' adaptation to online learning during the COVID-19 epidemic and nationwide school closures. The study's participants were enrolled in a master's program in business administration at a business school affiliated with Savitribai Phule Pune University. Due to the pandemic, the business school suspended classroom instruction and instead delivered the remaining course material via OLEs such as Microsoft Teams. Interviews with participants took place in mid-April 2020, at the conclusion of the second semester. The study enrolled 35 students. Microsoft Teams enabled 35 students to participate in structured interviews. Eight open-ended questions were asked of participants regarding their transition to OLE and their perspectives on teaching and learning in a technology-mediated environment. Additionally, the interview questions were verified by a university panel of specialists (three faculty members and two students). The initial coding, conducted using NVivo software, identified patterns, categories, and connections between the codes. The data from the interviews revealed fifteen distinct categories. The categories revealed five major themes.

The researcher mentioned that the participants emphasized the importance of having a computer and Internet access in order to participate in online courses. It is evident that online education requires access to an unrestricted Internet connection via a desktop, tablet, smartphone, or laptop. Study participants (n=32) stated that an Internet connection was a significant impediment to online learning. While some participants believed online learning was more beneficial than traditional learning and improved their ability to focus, others believed it was ineffective. These findings are common to all developing countries. Even though the OLE has a number of benefits over traditional classroom instruction, in this study, several participants criticized the OLE for its lack of one-on-one conversations with the teacher and clarification. According to some participants, the sessions devolved into one-way communication between instructors, and the instructional materials were delivered in an ineffective manner. Additionally, participants stated that students struggled to maintain focus in class due to distractions, numerical and practical courses were difficult to grasp online and teachers' lack of control in an online environment. Furthermore, research has revealed, online learning is best suited for theoretical courses rather than practical courses involving numerical concepts. The learners agreed that the most critical factor was the instructor's physical absence. The participants perceived a dearth of learner-instructor interaction in the OLE. Student engagement was harmed by the distance, resulting in one-way teacher contact. These findings should be finalized after analyzing the course activities and delivery mechanism. As the authors suggested, additional studies with a larger sample size should be conducted in India's other regions, as well as there should be improved OLE delivery and more training on OLE in underdeveloped countries such as India.

## What Is Open Pedagogy? Identifying Commonalities

Tietjen, P., & Asino, T. I. (2021). What Is Open Pedagogy? Identifying Commonalities. *The International Review of Research in Open and Distributed Learning*, 22(2), 185-204. <https://doi.org/10.19173/irrodl.v22i2.5161>

Reviewed by Helen DeWaard (Lakehead University, Canada)

In the field of open education, there are contentious debates and problematic terminologies that impede research. Tietjen and Asino (2021) attempt to bring clarity to the conception of open pedagogy since a “definition acts as a calibrating lens to look at a phenomenon” (Tietjen & Asino, 2021, p. 199). In addition, the authors apply the short form OP to refer to open pedagogy, which helps differentiate this concept from the current confusion when using OEP for both open pedagogy and open practices. This research is a commendable effort to bring much needed cohesion to the challenging concepts of open pedagogy.

The extensive review of the research upon which Tietjen and Asino construct their five-circle framework is bounded by the years 2011, when web-based open education expanded after the Open Educational Quality Initiative (OPAL) Report (Andrade et al., 2011) and the year 2020. The authors divide this time frame into two phases using 2017 as the dividing mark since, as they explain, this was designated the Year of Open and the OER17 conference generated a significant number of blog posts on the topic of open pedagogy. While these benchmark years are understandable ones, this narrowed focus on a single event or conference venue potentially limits the scope of the research. A broader view could include other significant events such as the Paris Declaration (UNESCO, 2012), the Open Education Conference (OpenEd17, n.d.), or the OEGlobal Conference (OE Global Consortium, n.d.) where the tenth anniversary of the Cape Town Open Education Declaration (CPT+10, n.d.) was celebrated. These additional events and documents may have potentially contributed additional clarity to the search for a definition of OP.

The research review conducted by Tietjen and Asino (2021) included a variety of source types, such as peer reviewed articles, books and book chapters, and conference proceedings. The authors describe the search strategies used to locate the 938 documents referencing open education, open pedagogy, or open educational practices. This was further reduced to 87 articles by eliminating duplicates and focusing on articles that provided substantive detail to define open pedagogy. While further reduction to 24 articles was based on having “met the relevant criteria” (Tietjen & Asino, 2021, p. 188), these criteria are not explicitly discussed. The added value to Tietjen and Asino’s (2021) research is the inclusion of

germane blog posts emerging from the OER17 conference. While many names of blog post authors may be recognizable by those in the field of open education, the limitation in how these relevant blog posts were located should be recognized as a potential limitation. The selection of bloggers connected to the OER17 conference constrains the potential definitional insights from a diversity of voices. Overall, the research process and results are well described and the analysis and findings reveal interesting insights.

The five-circle framework presented by Tietjien and Asino (2021) provides an interesting conceptualization of OP and is grounded in the research. The five elements overlap and are interconnected. These elements include a diversity of voices, a participatory mindset, the application of open licenses, expansion beyond traditional academic boundaries, and cultivating collaboration (Tietjien & Asino, 2021). While this framework does much to bring coherence to the concept of OP by enhancing clarity and establishing the impetus for further research, there is a noticeable absence of an explicit inclusion of criticality and social justice. With this five-circle framework Tietjien and Asino (2021) accomplish their goal of identifying commonalities within the literature which will help others, particularly those new to the field of open education, make sense of the concept of OP, and add to the open discourse focusing on this conceptualization of OP.

Of particular interest are two key questions Tietjien and Asino (2021) ask. First, why are the learning sciences absent from the open pedagogy discourse, particularly with its connection to Scardamalia and Bereiter's (2014) knowledge-building network. Second, the question of why the "conversation around the term pedagogy as it relates to the OP literature is also ominously mute" points to a considerable gap in current research. Both questions point to areas that will potentially lead to further research, and makes this article a worthwhile read for anyone in the field of open education.

### Exploring Student Perceptions as Co-authors of Course Material

Werth, E., & Williams, K. (2021). Exploring Student Perceptions as Co-authors of Course Material. *Open Praxis*, 13(1), 53-67.

<http://dx.doi.org/10.5944/openpraxis.13.1.1187>

Reviewed by Glenda Cox (University of Cape Town, South Africa)

The authors compare their results to only two other studies on students that have been involved in OER-enabled pedagogy. Both of those studies were at large public institutions. This research therefore provides extremely useful empirical evidence of student perception and experience. The research supports previous

claims of the potential of this approach where students are motivated and gain skills and confidence.

This research takes place at private open enrolment university. Faculty redesigned a First- year seminar course to include OER-enabled pedagogy. The course had a 40% attrition rate, so the objective was to engage the students. Over 50% of the students attending were from low-income groups and therefore another purpose of the re-design was to save students money by including free materials.

Students were involved in creating content for the course and having their content included in an e-book. Students identified a knowledge gap, researched the topic and produced an artifact (video or infographic). This could be done individually or in groups. Students submitted project proposals, a draft with peer review and a final project. Instructors guided them along each step. Student's agency was enhanced with support from the instructors. They were also taught about Creative commons and could choose their own license and whether they wanted to be attributed.

A mixed-method approach was used. A survey was conducted with all the students in the last week of class, 92 (329) completed the survey (28% response rate). The survey questions are available as an appendix which is useful for other researchers when embarking on a similar OER-enabled pedagogy. The survey was followed by 12 semi-structured interviews. In terms of validity the authors discuss their involvement in redesigning the curriculum and facilitated training for instructors. They are careful on their transparency and reflexivity.

The survey included 15 questions. Six questions in the survey focused on students attitudes towards this new OER-enabled pedagogy. Around 40 % of students were excited, motivated, positive, and engaged by the new course curriculum. The survey used a Likert Scale and neutral responses to these questions ranged between 35-44%. Students were not concerned about having their name on materials and having the materials available for future classes.

Three questions measured whether student's skills improved in three areas, completion of a multi-week project, collaboration and research and drawing conclusions. Positive responses ranged from 44%- 56.5%. Students were willing to take another course like this although 38% were indifferent, this result was similar to what Hilton et al found.

The interviews provided greater insight into why students were motivated and felt positive about OER-enabled pedagogy. Students wanted to help others and so they were pleased that the resource they created may be useful in future. Students enjoyed agency and being able to choose topics that they found interesting. This agency is an important affordance of this open pedagogy and it disrupts the power balance in the class giving students a voice and ownership of teaching materials.

This empowering aspect aligns with calls from students globally to decolonise curricula and align with principles of social justice.

The first research question addressed the area of student motivation and engagement in this open pedagogy. As hypothesised students were mostly excited and positive about the course. Their engagement was positive. This aligns with the work of previous authors (Hilton et al and Sheu).

The second research question focused on any concerns students might have about the 'openness' of the assignments. As predicted students were keen to have attribution. The authors suggest that there may be a connection between social media use and one's willingness to share. More research needs to be done in this area.

There were lots of neutral responses, is this a first-year student trend? Researchers will only know if more surveys are completed. There were also a small percentage of negative and/or unmotivated students. One reason given was that these students felt other students would not use their resources in future. This can be tested in future years as OER pedagogy matures.

Understanding student experience of the co-creation of materials is a very important aspect of future research in open pedagogy. More studies like this one at different institutions with different levels of students and different disciplines is needed to improve the process of the design of co-created student materials.

### Affordances, Challenges, and Impact of Open Pedagogy

Baran, E., & AlZoubi, D. (in press). Affordances, Challenges, and Impact of Open Pedagogy: Examining Students' Voices. *Distance Education*.  
10.1080/01587919.2020.1757409

Reviewed by Caroline Kuhn (Bath Spa University, UK)

This paper attempts to understand how students conceptualise open pedagogy practices (OPP) and how they perceive the affordances, challenges, and impact. This understanding, the authors claim, is critical to developing working models for open pedagogy in practice in higher education contexts. In order to this the researchers addressed two research questions, one directly related with participant's perception of the affordances and challenges of open pedagogy (OP) and the other explores student's perception of the impact of OPP on their knowledge and awareness of open access and their agency.

The study was designed using a single holistic qualitative case study for which 13 students from three American HEIs were selected. Participants had no prior experience with open practices and were asked to produce three different renewable assignments as OERs: an open online course module in Canvas Commons, an open online book chapter in PressBook, and a wikibook. The aim of these activities was to collect students' insight about their experiences while engaged in the open pedagogy assignments.

The researchers collected the data using reflection reports and semi-structured interviews which were analysed through a thematic analysis. The findings highlighted the affordances and challenges of six main OPP: content curation, peer feedback, community engagement, development, reflection, and scaffolding. Each of these practices were explored in certain depth by the authors summarising the perception of the participants in regards with each practice. Using that information the authors created the "open pedagogy in action" model. Although the model takes into account the practices that were identified by the participants it is not clear to the reader how the empirical data was then transformed into a practical model, what is the theory that was used to arrive at the process of generalising the data into a heuristic tool. The authors assure that the model "provides instructors with practices to develop students' knowledge and awareness of open access and student agency in the classrooms" I believe that such useful findings would be of better use if the authors would have given an overview of how this model is thought to operate in practice.

The authors suggest that further research is needed to address the strategies to promote students' critical engagement with OEP. It might be useful to explore the use of the model in practice to create some guidelines so that this can be added to such useful findings for the field of open educational practices. One excellent achievement of this paper is that it opens different lines of inquiry into the field, suggesting different possibilities that can be explored in open pedagogy, supporting new researchers to embark in any of these topics suggested by the authors.

### Evolving Into the Open: A Framework for Collaborative Design of Renewable Assignments

Katz, Stacy and Van Allen, Jennifer (2020). *Evolving Into the Open: A Framework for Collaborative Design of Renewable Assignments*. CUNY Academic Works.  
[https://academicworks.cuny.edu/le\\_pubs/306](https://academicworks.cuny.edu/le_pubs/306)

Reviewed by Michael T. Dabrowski (Athabasca University, Canada)

This paper is an attempt to formalize a collaborative renewable assignment design framework for use in pedagogical applications. The paper begins with a brief overview of the arguments against disposable assignments and in favour of renewable assignments as envisioned by Wiley and Hilton (2018). The authors build the framework on a class-based assignment one of them developed in the teacher training program. The course explores the flexibility afforded by OER licensing to remix, revise, adapt or create content.

This paper is not so much research, as it is a personal account and guidebook for the reader on the journey of transitioning from disposable to renewable assignments. The authors underscore that this is not intended as a rigid framework, but rather as a reflective practice to nudge faculty, librarians, and students towards the creation of meaningful open content. The process that the authors create is documented throughout with citations from well-known authorities on the OER creation process to lend weight to their process choices. More than anything else, this is an attempt to visually formalize open pedagogical practices so that others may use the framework when looking to transition from more traditional educational methods with emphasis on the need for collaboration between faculty and librarians to facilitate OER development.

To many OEP practitioners and those familiar with Wiley and Hilton's work, much of this text simply adds formal structure and more verbiage to the migration from disposable to renewable assignments. However, for anyone who is getting their feet wet and wanting a coach along the journey towards open practices, this provides a structured well documented point of departure into the increasingly popular field of open pedagogy. The ruminations between the two authors are presented to facilitate the reflective process so that readers can directly apply the framework to their immediate needs. This text also comes with links to key open pedagogy texts available online and appendices that include a rubric for evaluating student OEP work and links to sample output created by students shared with Creative Commons Licenses online.

### Becoming an open educator: towards an open threshold framework

Tur, G., Havemann, L., Marsh, D., Keefer, J. M., & Nascimbeni, F. (2020). Becoming an open educator: towards an open threshold framework. *Research in Learning Technology*, 28. <https://doi.org/10.25304/rlt.v28.2338>

Reviewed by Helen DeWaard (Lakehead University, Canada)

The search for defining characteristics and qualities of an open educator has prompted Tur et al. (2020) to present this 'diamond in the rough', a cross-pollination of two disparate lines of inquiry brought together to answer the question "Who are



open educators and what makes their practices different?" By connecting research on threshold concepts (Meyer & Land, 2006) with research to define an open educator (Nascimbeni & Burgos, 2016), the authors of this paper frame an argument for further empirical research into the "transformation, troublesomeness, and liminality associated with the formation of an open educator identity" (Tur et al., 2020, p. 11).

The authors suggest the conception of openness in education has shifted focus from the property of things (open educational resources as OER), toward the practices and processes of engaging with OER. The authors posit that research has yet to fully examine the identity and characteristics of those who orient toward OEP. This paper adds value to the body of research with a unique lens and theoretical framework that, when applied to OEP identity formation, will elicit new thinking and directions for research and practice. By considering identity building, as a component of OEP, through the lens of threshold concepts, the authors propose an inventive model that has some appeal. While threshold concepts (TC) theory focuses on learning and cognition, this paper shifts to focus on the social and organizational "ways of thinking, practicing and being which act to signal membership of, or changing status within, a community of practice" (Tur et al., 2020, p. 5).

Three of the eight threshold concept criteria are selected to illuminate the "shadowy figure of an open educator" (Tur et al., 2020, p. 6). These include criteria relative to transformation, troublesomeness, and transitions or liminality. The authors briefly explain the relevance of the three TC criteria in relation to the identity of open educators. Additionally, it would be helpful for the authors to explicitly state their rationale for the selection of the three TC criteria and specify definitions as provided in TC research. Meyer & Land (2006) identify the criteria for troublesome knowledge as ritual, inert, conceptually difficult, alien, tacit, and includes difficult language. Knowing these identifiers of troublesome knowledge would support the authors' argument that open educators need to redraw their conceptual maps and reject previously held beliefs about teaching and learning. As educators face troublesome moments to apply, reposition, or resist openness in their practice, this is less about the open education movement, as suggested by Tur et al. (2020), and more about the individual and accepted norms of practice.

There are potential commonalities in the TC conceptions presented in this paper to those found in literacy discourse. For example, the notion of identity as defined by Gee (2000) that is shared by the authors, links to a deeper study into identity as a process of being, doing, knowing, and becoming (Gee, 2017). Yet this minor omission only further enhances the potential expansion of ideas explored in this paper. As such, this paper will encourage others to investigate and present explicit examinations of the episteme, phronesis, and techne of open educational practices,

as they relate to threshold concepts. Thus, this paper fulfils its purpose to further the discourse around 'becoming' an open educator.

### Sprinting to the Finish Line: The Benefits and Challenges of Book Sprints in OER Faculty-Graduate Student Collaborations

Zapata, G. C. (2020). Sprinting to the Finish Line: The Benefits and Challenges of Book Sprints in OER Faculty-Graduate Student Collaborations. *The International Review of Research in Open and Distributed Learning*, 21(2), 1-17.

<https://doi.org/10.19173/irrodl.v21i2.4607>

Reviewed by Michael T. Dabrowski (Athabasca University, Canada)

This paper recounts the objectives, processes, and experiences of graduate students who participated in a book sprint format OER development of Spanish language resources. A brief overview of existing book sprint experiences where academic experts were brought in to create the OERs is followed by the author highlighting the gaps in these publications. The particular book sprint in question extends the existing research by using graduate students, and through the creation of some instruments to collect evidence about the efficacy of this OER creation process for the participants. The paper argues that the graduate student experience in the book sprint was both beneficial personally and professionally, something universally demonstrated in previous publications, while highlighting the challenges tying together the pedagogical objectives, the sprint experience, and the created open content.

The methodology for this research is appropriate given the limited size of the sample. With six graduate students, it would be difficult to use any other methodology than a case-study with mixed methods data analysis. While the author highlights the limitation of the study and ways in which it could have been made more robust, the book sprint case is well documented with sufficient detail to allow the reader to fully understand the process and underlying pedagogical and logistical foundations that guided the project. The research is timely, relevant and accessible, and despite the sprints focus on second language acquisition, the demonstrated pedagogical benefits for the participants invite the reader to extrapolate to their own disciplines and developmental levels.

Unsurprisingly, the participants all reported positive experiences working in collaboration with peers on a project complimenting their disciplinary interests. In fact, the researcher highlights this as the most impactful benefit due to the personal and professional growth opportunities that collaboration provided. The clear benefits of developing OERs to future teachers are highlighted through interpersonal knowledge transfer, shift in perspective from student of teaching to

teacher of students, and an increased confidence in their teaching abilities as demonstrated through OER development.

The author cites the lack of completion of the assigned OER chapters in the allotted time as a frustration factor for both team lead and participants, and critiques the format of the book sprint and its inherent restrictions. Perhaps this highlights that book sprints should be a process and that OER creation is iterative in nature, in contrast to the traditional publishing model. The argument and conclusions are presented clearly and succinctly. However, the emphasis on personalization of OER sprints to participants for the maximization of pedagogical benefits seems to suggest that the ideal form of this methodology is unlikely to function in our increasingly financially constrained environment.

This paper extends open education research focused on professorial collaboration and shifts the practices to graduate students, clearly demonstrating the capacity of these academics-in-training to contribute to OER creation in a meaningful way both to themselves and the global community.

## Quality

### Quality Assurance of Open Educational Resources

Zawacki-Richter O., Müskens W. and Marín, V. I. (2022) Quality Assurance of Open Educational Resources. In: Zawacki-Richter O., Jung I. (eds) *Handbook of Open, Distance and Digital Education*. Springer, Singapore.

[https://doi.org/10.1007/978-981-19-0351-9\\_43-1](https://doi.org/10.1007/978-981-19-0351-9_43-1) /

[https://link.springer.com/content/pdf/10.1007/978-981-19-0351-9\\_43-1.pdf](https://link.springer.com/content/pdf/10.1007/978-981-19-0351-9_43-1.pdf)

Reviewed by Kathryn R. Johnson (Athabasca University, Canada and Northern Michigan University, USA)

The article begins with the acknowledgement that open education has deep roots that expanded during the 1960s' nontraditional learning initiatives enhanced by the technology that facilitated the establishment of open universities. In more recent years, the open education movement has expanded with the creation and proliferation of Open Education Resources (OER) and policy statements by organisations that advocate creating and disseminating OER as an essential tool to help achieve the United Nations 2030 Agenda Sustainable Development Goal of creating more inclusive and open knowledge societies. The authors contribute to this goal by creating an OER quality assessment instrument that will help overcome

the widely recognized barrier of OER quality concerns that continue to hinder OER implementation worldwide.

The article summarises findings from the EduArc ten-country case study, published in a 2020 article, that investigated digital infrastructure in higher education and quality standards for OER. China, Korea, and Turkey have top-down national regulations for OER quality. Canada, Japan, and Spain rely on the meso level with independent institutional guidelines. Individuals at the micro level conduct quality assurance of OER in Australia, Germany, and South Africa. These examples illustrate the impact of political centralization or lack thereof in the ten countries. A reader with no prior knowledge of the EduArc project may find this section confusing and would likely need to read the prior publications for clarification about faculty perceptions of OER quality and how the Hamburg Open Online University's study informed the creation of the OER quality model.

The article's core contribution to open education praxis is a validated and reliable Instrument for Quality Assurance of OER (IQOER). The IQOER offers two synthesized options to assess 15 quality criteria. The short version uses classification scales with ratings from one to five for each criterion. To remedy potential measurement obstacles of the short version, the long IQOER uses the mean of Likert scale results for each criterion. The IQOER is a timely, useful, and clear quality assessment tool.

The authors stress that quality assurance, instruments, and assessment should be embedded within a broader quality assurance process with attention to when, by whom, how, and why any OER assessment occurs. The authors elaborate on each of those four considerations. They also emphasised that any measuring instrument should be a starting point for an ongoing quality improvement process that engages the many stakeholders involved with OER. Ultimately, any quality assessment process should facilitate the goals of creating OER, helping individuals and institutions select quality OER, informing users, and contributing to open educational practices that will help fulfil the UN Sustainable Development Goals of equitable and inclusive education.

Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education

Baas, M., van der Rijst, R., Huizinga, T., van den Berg, E. and Admiraal, W. (preprint). Would you use them? A qualitative study on teachers' assessments of open educational resources in higher education. *The Internet and Higher Education*. <https://doi.org/10.1016/j.iheduc.2022.100857>

Reviewed by Kathy Essmiller (Oklahoma State University, USA)

The purpose of this paper is to share what teachers themselves consider when evaluating the quality of open educational resources. Open educational resources (OER) are defined in this piece as materials licensed in a way “which enable teachers to retain, re-use, remix, revise and redistribute the resources” (Baas et al., 2022, p. 1). The authors gathered data from eleven participants teaching in higher education; data collection methods included pre and post association maps, plenary meetings, and individual interviews. The data was analyzed in three phases. The first phase used a two-column method “based on Argyris and Schon (1974)” (Baas et al., 2022, p. 4). The second phase brought the authors to their final themes, and the third phase included an independent researcher’s validation of the data collection process and quality. The authors found that teachers consider content, design, usability, engagement, and readability when evaluating the quality of OER.

The article includes a literature review which draws upon the work of contemporary researchers, highlighting questions and explorations related to open practices which have been recently undertaken, in addition to scholarship which has informed research in the field over time. The methodology is well justified, and the methods are described in sufficient detail for researchers seeking to replicate the study. The authors share a rich account of their data analysis, enabling readers to clearly understand how the themes were determined. While acknowledging limitations related to teacher’s familiarity with the subject area for which they were evaluating the OER, the authors have enacted and shared out a replicable research project. The findings suggest that teachers should be included in curriculum related conversations about OER. The authors also recommend that institutions of higher education provide support for teachers adapting OER.

## Social Justice

Advancing Social Justice for Asylum Seekers and Refugees in the UK: An Open Education Approach to Strengthening Capacity through Refugee Action’s Frontline Immigration Advice Project

Charitonos, K., Albuene Rodriguez, C., Witthaus, G. and Bossu, C. (2020). Advancing Social Justice for Asylum Seekers and Refugees in the UK: An Open Education Approach to Strengthening Capacity through Refugee Action’s Frontline Immigration Advice Project. *Journal of Interactive Media in Education*, 2020(1), p.11. <http://doi.org/10.5334/jime.563>

Reviewed by Paco Iniesto (The Open University, UK)

The authors in this paper point out Britain's asylum system is failing the most vulnerable and for that purpose, the charity Refugee Action developed the Frontline Immigration Advice Programme (FIAP). FIAP is a technology-supported capacity strengthening programme that aims to increase access to justice for those going through the asylum system in the UK. The authors provide a detailed literature review about access to social justice in the UK. The key aspect of the research carried out in the paper has to do with the design of the FIAP programme, for that purpose authors had interview six people from the organisations involved in the FIAP, but as well, from Refugee Action and the Office of the UK's Immigration Services Commissioner.

The methodology used is a view on social justice to explore the relationship between social justice and open education. Results from the research contribute with six dimensions for social justice approaches for professional learning as demonstrated through the case of the FIAP as an Open Education initiative for Social Justice. The dimensions are:

- Deliberate iterative design.
- Access to provision.
- The flexibility of provision.
- Development of resources.
- Support
- Advancing knowledge and skills whilst adapting to the workplace.

Authors point out that all these dimensions should be carefully considered to create spaces for practice and care for the most vulnerable, as well as for those involved in the provision of services. This using this approach will help to address some of the systemic issues affecting the refugee sector and will also support empowering, enhancing legal literacy and self-agency for professionals in the sector.

Even the sample is relatively small and limited to a UK context, it is based on expert and experienced profiles in the area of a programme such as FIAP. An added value is that it keeps strong foundations on Open Education as an initiative for Social Justice. It will be certainly promising to see how the dimensions are used in future research for their refinement of a framework for working with organisations to provide holistic support for professional learning across an entire sector, with a longer-term aim to increase impact through openness. This aspect is as indicated by the authors quite important since the use of digital and online technologies for learning in sectors other than traditional educational settings is in expansion.

## Open educational resources and social justice: Potentials and implications for research productivity in higher educational institutions

Ochieng, V. O., & Gyasi, R. M. (2021). Open educational resources and social justice: Potentials and implications for research productivity in higher educational institutions. *E-Learning and Digital Media*, 18(2), 105-124.

<https://doi.org/10.1177%2F2042753021989467>

Reviewed by Paco Iniesto (The Open University, UK)

The focus of this extensive paper is to analyse the contribution of OERs and Social Justice on research productivity in higher education institutions using as methodology a scoping review. Authors in the background literature define the context of OERs and Social Justice. Then move on that relationship to their use on research productivity in institutions of higher learning, considering the positive benefits of OER to different stakeholders (learners, educators, institutions, and governments) and addressing key educational challenges. Authors detail, as well, some of the most notable OER initiatives (OpenLearn, OER Impact Map, OERu, UNESCO-COL OER, etc until a total of 22). Finally, the impact, threats and demerits of OERs are reviewed considering how OERs emphasise the objective of altering the accessibility of learning materials to enable learners to take active roles in shaping their learning. While limitations reported include sustainability issues, quality, and intellectual copyright.

Some of the findings indicate that the proponents of OERs and OEPs largely guided by Social Justice ideals are keen on changing the narrative around the educational provision and its perception and understanding in the contemporary world. Evidence points to a positive impact of OERs and OEPs on research productivity in higher education, there are salient challenges that ought to be addressed if OERs and OEPs are to have maximum impact in the educational sphere. The infrastructural, technical skills gap, economic, social, and legal challenges that impede full actualization of OERs by stakeholders, must be addressed if universal operationalisation of OERs is to be realised. One example given is the overuse of English OERs limiting Social Justice in different languages.

Following the authors' argumentation, the fact that many open and free-to-use resources and websites are available on the internet means that optimisation of OERs requires attitudinal change among users on web-based learning and usage. Therefore, some implications are suggested from this piece of research for the future of OERs and social justice:

- Raise OERs awareness among stakeholders on the existing OERs in terms of long-standing viability and quality.

- Institutions should put in place open publication divisions to plan and support the publication of books and journal papers on emerging areas.
- Establishment of appropriate infrastructure for ICT facilities, research centres, and online information.
- Infrastructural development through the creation of institutional research funds.

In general terms, the article provides a good review of Open Education and Social Justice concepts and background but lacks innovative proposals reproducing some of the well-known facts and providing relatively naive implications.

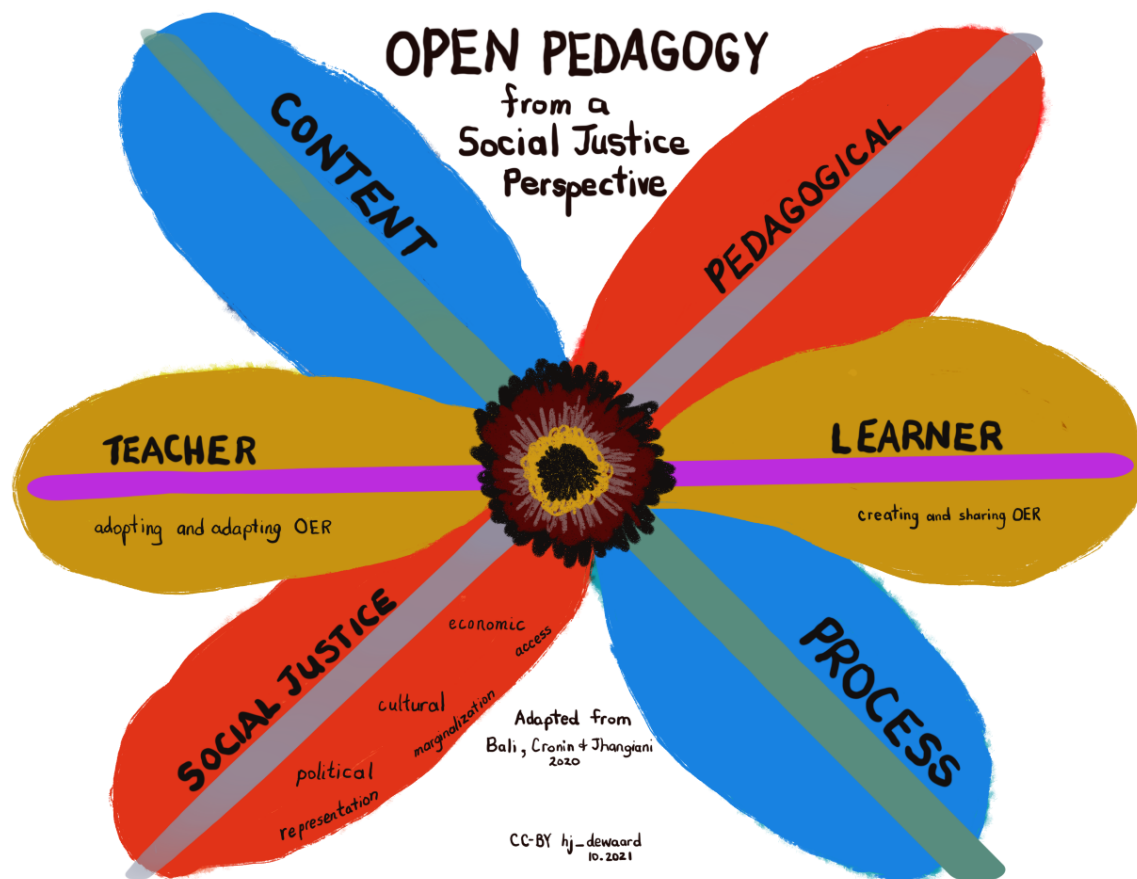
### Framing Open Educational Practices from a Social Justice Perspective

Bali, M., Cronin, C. and Jhangiani, R.S.. (2020). Framing Open Educational Practices from a Social Justice Perspective. *Journal of Interactive Media in Education*, 2020(1), p.10. <http://doi.org/10.5334/jime.565>

Reviewed by Helen DeWaard (Lakehead University, Canada)

Bali et al., (2020) explore definitions of open educational practices (OEP) and present a typology that supports a nuanced application of openness across continuum and along three axes. These three axes of openness are defined as content-centric to process-centric, teacher-centric to learner-centric, and primarily pedagogically focused to primarily for social justice (Bali et al., 2020). These are examined simultaneously in the OEP analyzed in “expansive conceptualisations of OEP that center on process more than content” (Bali et al., 2020, p. 1), which may make this a challenging read for those new to the field of open education or those looking for ways to integrate social justice into their open teaching practice. The following graphic is offered here in an effort to bring understanding to this complex conceptualization.





The authors investigate several examples of open pedagogical strategies from a social justice perspective to examine the economic, cultural or political injustices inherent in their designs. Readers can gain clarity for this analysis by also reviewing the social justice framework presented by Hodgkinson-Williams and Trotter (2018), upon which the authors frame their analysis. The open educational applications include: renewable assignments in the form of student created quiz questions; open connected courses, such as Equity Unbound; public scholarship by/for educators; public scholarship by/for students, such as Domain of One's Own; Virtually Connecting; Wikipedia editing; and collaborative web annotations, such as marginal syllabi using Hypothes.is. Bali et al., (2020) provide a detailed and specific examination of the negativity, neutrality, ameliorative, or transformational contexts. This allows for consideration and re-evaluation of the impact of open pedagogical practices on social justice related issues such as equity, diversity, inclusion, marginalization, Indigenous knowledge, representation, and participation.

The data presented within the tables merit a closer examination and should not be ignored since the information offered in these summaries support the analysis provided in the body of the article. While the critical analysis completed by Bali et al., (2020) is extensive, there may be additional examples that could be included to

expand the inquiry into OEP. While this exploration encourages a continuation of the application of social justice perspectives to the analysis of additional OEP, there is one omission in the collection of exemplars, e.g. the integration of Wikipedia editing into course work and participation in Wiki Scholars work as a form of public scholarship for both educators and students (Davis, 2021).

Bali et al., (2020) present a variety of concepts and applications that connect to the social justice focused open learning strategies which, when examined carefully, can expand open teaching and learning practices. These include: using a critical digital pedagogical approach as modelled in Equity Unbound; making tacit and hidden teaching processes explicit and transparent as modelled in the Open Pedagogy Notebook, the Faculty Patchbook, and the Open Learner Patchbook; challenge power dynamics and systemic practices that limit freedom of expression; enhance a “parallel mode of developing social capital” (Bali et al., 2020, p. 8) through engagement and participation within affinity space structures (Gee, 2017) that encourage agency and design; examine the gatekeeping of knowledge by dominant voices; and, enhance deep reading and co-construction of knowledge through social annotation.

Bali et al (2020) offer much to consider in this concise exploration of openness and OEP, with current references to relevant literature supporting their explorations into social justice focused teaching strategies. The authors conclude with a caution that social justice considerations do not redress social injustice and projects emphasizing openness may not “meet the needs of those farthest from justice” (Bali et al., 2020, p. 12)

## Technology and Infrastructure

### Online Infrastructures for Open Educational Resources

Marín V.I., Villar-Onrubia D. (2022) Online Infrastructures for Open Educational Resources. In: Zawacki-Richter O., Jung I. (eds) *Handbook of Open, Distance and Digital Education*. Springer, Singapore.

[https://doi.org/10.1007/978-981-19-0351-9\\_18-1](https://doi.org/10.1007/978-981-19-0351-9_18-1)

Reviewed by Vidminas Vizgirda (University of Edinburgh, UK)

This article presents an overview of Open Educational Resource (OER) infrastructures around the world ('infrastructures' meaning 'sources that host OER'). It covers the main kinds of infrastructures, e.g., repositories and open textbooks, international examples of such infrastructures, and examples of initiatives in each

continent. The article then follows up with a literature review of the main challenges faced by OER infrastructures.

The list of presented examples is not exhaustive, which is unsurprising, as there are thousands of existing OER initiatives. Most chosen examples are Higher Education oriented. The ones described in this article seem to be the most popular instances, although no explicit criteria for including or excluding examples are mentioned, which a structured literature review would have to include.

The research question is not made explicit in this article – the overview is a factual historic account of OER infrastructures and the literature review is broad and generic, so an implicit research question may be “what OER infrastructures are out there and where are they?”. The conclusion states that OERs are used differently in different institutional, social, and cultural contexts and that further research on the topic is needed. This conclusion is backed up by some references in the literature review but is unexpected – it is not linked to the implicit research question. It could be linked if the preceding overview of infrastructures included details about the social and cultural context of presented examples.

Overall, this article offers a brief introduction to the topic of OER infrastructures. It is written accessibly for someone new to this topic, includes helpful maps and diagrams, and links to the websites for most of the given examples of infrastructures. It could be helpful as an overview for people unfamiliar with the topic or as a reference of links to existing initiatives categorised by geographical boundaries for researchers focusing on a specific geographical location. This article could also appear in the literature review chapter of a larger publication, focusing on a specific research question.

### An Embodied Perspective of Open Educational Resources (OERs) Collaborative Design supporting Self-determined and Autonomous Learning

Mazzucato, A. and Kic-Drgas, J. (2021). An Embodied Perspective of Open Educational Resources (OERs) Collaborative Design supporting Self-determined and Autonomous Learning. *Proceedings of the Third Symposium on Psychology-Based Technologies (PSYCHOBIT2021)*, October 4–5, 2021, Naples, Italy.

<http://ceur-ws.org/Vol-3100/paper1.pdf>

Reviewed by Robert Farrow (The Open University, UK)

This conference paper from 2021 reports on work being carried out in the EULALIA project (Enhancing University Language courses with an App powered by game-based Learning and tangible user Interfaces Digital Creativity Enhanced in Teacher education). The main focus of the project is a tool that has been created to facilitate language learning by offering “multimodal-multisensory learning

scenarios” that are more embodied, gamified, and flexible. This is achieved by using the STELT (Smart Technologies to Enhance Learning and Teaching) software in conjunction with interactive physical maps which can be read using the nearfield communication (NFC) reader on an Android smartphone. As users navigate their maps they can engage in different language learning scenarios which are held to be more authentic because they represent real-world interactions.

The OER element here is found in using a collaborative design framework to produce learning objects and STELT scenarios for language learning. The relevant affordances are in the co-creation of a learning object which brings educators and learners together in a partnership of open pedagogy. Two workshops provided the principal contribution for the creation of the OERs. The OER examples discussed in the paper include scenarios for shopping, studying, transport and finding accommodation.

However, the OERs themselves are not really the focus of the paper. No detail is provided about licences used or where to find the OERs for potential reuse. Rather, OER seems to be a route for effective collaboration in a broadly Constructivist paradigm. The extent to which these learning scenarios can be described as ‘embodied’ is also debatable since it mostly just involves moving a smartphone over a map or other image rather than pulling up the same information through a website, for instance.

Perhaps these are elements which will be addressed as the project progresses. The piloting and evaluation of EULALIA is ongoing, but it is good to see ways in which OER can be integrated into collaborative research.

#### Visual citation navigation of open education resources using Litmaps

Kaur, A., Gulati, S., Sharma, R., Sinhababu, A. and Chakravarty, R. (2022). Visual citation navigation of open education resources using Litmaps. *Library Hi Tech News*, Vol. ahead-of-print No. ahead-of-print.  
<https://doi.org/10.1108/LHTN-01-2022-0012>

Reviewed by Robert Farrow (The Open University, UK)

This short conference paper details the development and features of the Litmaps software. Litmaps provides visual representations of citation networks and other connections between items of literature relating to OER. The citation networks can be understood in terms of different degrees (i.e. citations of citations) which highlights the indirect relationships between papers and evolutions in citation

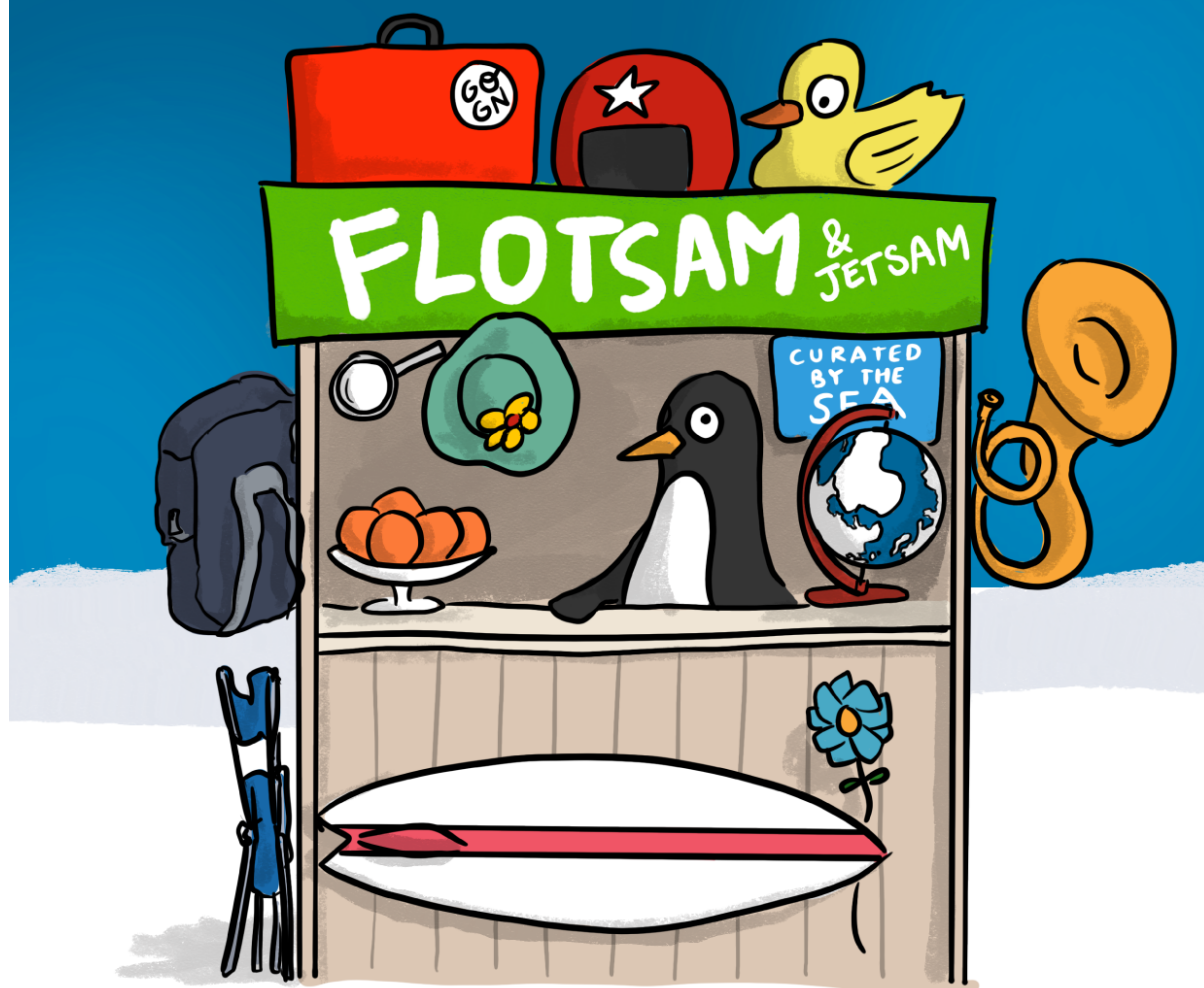
networks over time. Litmaps offers an elastic search function which allows for alternate ranking and presentation of results.

Most of the functionality offered by Litmaps is generic in so far as the same network analysis engine could be applied to any field of literature. Consequently, while the functionality described is powerful and could lead to new insights, there is not an obvious sense of how this might be integrated into an OER workflow for teaching and learning. However, the interface does support connections to Orcid and has some citation management capabilities (if you're using Bibtex files).

Perhaps the most interesting feature for a researcher is the ability to generate literature maps from a single DOI, offering a way to quickly purview the significance of a particular piece of literature. It should be noted, however, that the algorithm (built using Microsoft Academic Graph and Semantic Scholar) used to identify and organise map connections does not display exhaustive results but those which have been filtered. Thus, it is possible to overlook some resources and/or connections. This perhaps limits its usefulness as a research tool.

As a way of exploring literature, Litmaps offers some interesting functionality that could be useful - but it is best thought of as a complement to more traditional approaches to search, discovery and management of references.

# ADDITIONAL RESOURCES



## Additional Resources

In the sections below we have reproduced relevant content that is available elsewhere on an open licence. Sharing knowledge in this way is an important part of open practice in research and provides ways to share expertise.

In some places we have adapted existing content but in others we just provide basic information and encourage the reader to go and check out the originals.

It should be noted that some of the resources reproduced are several years old and the information might be superseded. For instance, there may be more up to date academic papers and studies in some areas. Some of the content is written for a specific audience and might only be directly relevant for them. Not everything is covered comprehensively, but we hope to provide the reader with a useful set of resources to get started with research into open education.

Full citations for the content below can be found in the [Acknowledgements](#). Many thanks to the original authors for sharing their content openly!

## Open Research Overview

Open Research is a set of principles and practices whose aim is to make the outputs of research freely accessible and usable, thereby to maximise the possibility of public benefit. It has been described as ‘scholarly research that is collaborative, transparent and reproducible and whose outputs are publicly available’ (Integrated advice of the [Open Science Policy Platform](#)). It is based on the principle that knowledge produces the greatest benefits if it is shared as widely as possible.

## Open Research

Open Research is relevant to all researchers and all disciplines, although the applications will differ according to discipline and research context. There are many different definitions of Open Research, but a number of themes can be identified (not all of which are relevant in all cases):

- making the outputs of research, including publications, data, software and other research materials freely accessible;
- open or standard licences providing permissions for re-use;
- using online tools and services to increase the transparency of research processes and methodologies;
- making scientific research more reproducible by increasing the amount and quality of information placed on the public record;
- using alternative models of publication and peer review to make the dissemination and certification of research faster and more transparent;
- using open collaborative methods to increase efficiency and widen participation in research.

The principles of Open Research are reflected in the policies of many public funders and research organisations that promote greater public access to research, and in evolving models of scholarly communication. Change is also being driven by the needs of academic communities and stakeholders among the general public, in industry, and in the developing world.

In this context, the [UNESCO Declaration on Open Science](#) is an important strategic document. It sets out a wide range of reasons for the open agenda, including addressing poverty and inequality; the transformative potential of a more participatory approach to science; educational inclusion; scientific progress; and the importance of infrastructure. UNESCO member nations are expected to implement it through national policy and legislation where relevant.



In Europe, [Open Science](#) usually applies to research in all disciplines. But the term is also commonly used in specific reference to the empirical sciences, where issues of accessibility, transparency and reproducibility are most acute. While access to the outputs of research is important irrespective of the discipline or nature of the research, many open practices are mostly or solely relevant to the sciences. Researchers in all disciplines can share their primary data and materials in order to maximise their value and enable re-use

So Open Research is accessible, transparent and reproducible. But, to paraphrase one author, [isn't that just research](#)? In other words, what is the problem with research that makes people insist on the need for it to be open?

In fact, research has several problems:

- [Two thirds of the scholarly record is hidden behind paywalls](#). Of the 2 million peer-reviewed articles published in 2018, over 1.4 million are inaccessible to many researchers as well as the wider public, with those outside the developed world academic network disproportionately denied access to vital scientific literature. Not only does this situation exacerbate global inequality, it wastes untold opportunities to generate public and economic benefit from research.
- Many valuable outputs of the research process, in particular research data and software, are undervalued in academic cultures and reward systems, and are [not made accessible for re-use by others](#): they may not be shared at all, or may be shared with poor annotation and documentation, and in formats (such as PDF) that do not enable easy re-use. Lucas-Dominguez et al. (2021) found that although public health emergencies have often been referenced as drivers of Open Research practice (e.g. the Covid preprint surge) the true picture is more complex. Of 5,905 articles related to COVID-19 published from 1 December 2019 to 30 April 2020, only 13.6% published underlying research data and 75% were PDF or Word documents which can impede reuse.
- Empirical research is characterised by poor [rates of reproducibility](#), the result, variously, of avoidable weaknesses in research design and methods, the lack of detailed information about hypotheses and methods in published findings, and the failure to share supporting data and code used in analysis of results. A [survey conducted by the journal Nature in 2016](#) found that over 70% of scientists had been unable to reproduce the work of others, and over 50% could not reproduce their own experiments! This represents a massive waste of resources, and in areas such as medical and pharmaceutical research

seriously depresses the development of effective treatments. In 2015 it was estimated that [irreproducible biology research costs USD 28 billion per year](#).

- The certification and release of research for the public record remains largely tied to a closed process of peer review, which is vulnerable to the judgement of a few (often anonymous) peer reviewers, not publicly accountable, and heavily skewed by the phenomenon of [publication bias](#) – the overwhelming tendency to publish reports of novel research and significant effects at the expense of null and negative results. This leads to suppression of large amounts of research based on limited non-transparent assessments and other factors unrelated to the quality of the research.
- The communication of valuable research results can be [subject to lengthy delays](#) as papers proceed through publishers' closed submission and peer review systems, slowing the rate of individual productivity and scientific progress. Authors may become trapped in a serial submission process lasting months and even years as they seek to secure acceptance for a paper. The effective result is suppression of research by delay.

## Open Practices

The following open practices can support open research:

- using publication under an open licence to communicate research outputs, which may include publications, data, software code, and other materials;
- disseminating research findings using preprint servers or preprint journals;
- submitting a paper to a journal under a formal open peer review process managed by a publisher, or acting as a peer reviewer under a publisher-managed open peer review system;
- creating a public pre-registration of a study design or publishing a study as a registered report;
- publishing a formal peer-reviewed description of research resources, such as a data paper or software paper;
- incorporating open and participatory methods into the design and conduct of research, e.g. by using open notebook-based methods or creating a project using a citizen science online platform;
- introducing Open Research concepts, practices and resources into teaching and learning;

- creating tools or technologies to facilitate Open Research practices, e.g. for combining or repurposing datasets and other research outputs from different locations or disciplines, or for mining content; using [open hardware](#)
- undertaking activities to develop the environment for Open Research, e.g. by engaging in high-profile communications, by causing a journal to adopt pro-Open Research policies, or by participating in community initiatives to develop data or metadata standards.

## Open Licences

Permissions to access and use an item, in order to be a basis that other users can rely on, need to be explicitly stated, irrevocably given and legally recognisable. These conditions are met by making an item available under a licence.

A licence in this context is an official authorisation to make use of specified material. It tells prospective users what they are and are not allowed to do with an item of intellectual property. An item without a licence may be for some practical purposes unusable. A researcher may not use a dataset if they are not permitted to modify or redistribute it; a company would not base commercial operations on third-party software without a warrant that it can be used for the required purpose.

Licences also provide protection to the creators and owners of intellectual property. Accompanied by a rights statement, a licence establishes legal ownership of the licensed item and asserts the right of its creator(s) to be recognised as such. The attribution condition that is common to many open licences is the legal basis of your right to be credited as the creator of the licensed material. Many licences also include formal disclaimers of liability for any harm or damage that may arise from someone else's use of the material.

Open licences have come to be widely used for licensing the outputs of research (as well as other copyright materials) in order to maximise their potential for re-use. Examples of open licences include:

- [Creative Commons](#) licences for creative works (including research publications and datasets);
- [Open Source licences](#) for software source code;
- Licences for specific types of work, such as the [Open Data Commons](#) licences for databases;

- Government open data licences, such as the UK [Open Government Licence](#) for public sector materials;
- Public domain dedications, such as the [Creative Commons CC0 Public Domain Dedication](#): strictly speaking, this is a rights waiver, not a licence, but it is generally considered as a type of open licence.

All open licences share certain features:

- The licence is expressed as a standard set of terms (the legal code) published by the licence provider. In the licence statement attached to a work the legal code should be clearly referenced by means of its URL or by inclusion in full in the licensed material.
- The licence is essentially permissive (as against all rights reserved copyright and proprietary licences, which are restrictive). Its purpose is to enable other people to make use of the licensed material. The definitive open licence makes an item free to access, use, modify and share by anyone for any purpose. A licence which prohibits use for commercial purposes or the distribution of derived materials does not meet the full definition of an open licence, because of the restrictions these terms place on re-use, but it is still on the open spectrum. There may be valid reasons for publishing under an open licence with some restrictions, such as to protect a commercial interest or prevent misuse of works produced in humanities where the form of expression is integral to their value.
- The licence usually includes protections for creators and owners of the licensed material, in the form of a liability disclaimer and an attribution requirement. A Public Domain Dedication (such as CC0) does not include an attribution requirement, since it is by definition a waiver of rights in the material, but can still include a liability disclaimer.

The Creative Commons licence suite includes versions with Non-Commercial and No-Derivatives terms. These may be considered open, in that they enable the material to be freely accessed, although they are not open in the fullest sense because of the restrictions they place on re-use. If material cannot be made available under a fully open licence, it is still wise to publish under a standard licence that offers the closest approximation. CC BY-NC may not be the most open licence, but it grants broad permission for use in research and teaching and other non-commercial activities.

## Open Data

Sharing research data is increasingly an expectation made by funders. This is often done to support the substantiation of research evidence or to enable the reproduction of scientific results. Research data is increasingly seen as a valuable research output in its own right and making data open is a good route to greater impact and reuse.

There are various licence options for open data, and there is more latitude for creators of datasets to exercise judgement in the selection of a suitable licence. This is because datasets can be complex: they may incorporate intellectual property from multiple sources, and may be subject to various third-party restrictions, for example, concerning re-use for commercial purposes.

As a rule, you should select the most open licence option, and only introduce restrictions where these are justified by the nature of the material or by any third-party requirements. (For example, if a dataset is the product of research undertaken with a commercial partner, the partner may require release of the dataset under a non-commercial licence, in order to protect its commercial privilege.)

According to [The Open Definition](#), open data 'can be freely used, modified, and shared by anyone for any purpose'. But permission alone is not enough if there is no means to find, access and use the data. Open data also have to be:

- explicitly identified and formally entered on the online public record, so that they can be accurately cited and discovered;
- accessible, so that they can be opened, read and processed;
- presented and documented in such a way that they can be understood and used.

These usability conditions are expressed in the [FAIR Data Principles](#), according to which data must be Findable, Accessible, Interoperable and Re-usable. The FAIR Principles were first set out in 2016 by a group of stakeholders from academia, industry, funding agencies, and scholarly publishers. The Principles put specific emphasis on the ability of machines to automatically find and use data and/or related metadata, in addition to supporting re-use by individuals. FAIR data don't have to be open, and there may be good reasons why they can't be (legal, ethical, commercial). In such instances, FAIR still supports reuse.

### Findable and Accessible

What does FAIR mean in practice? Let us consider the FAIR Principles in more detail. It is quite common for articles reporting findings based on collection and analysis of primary data to say something like this: 'Data supporting these findings can be supplied on request'. Permission to access the data is given, but are they findable and accessible?

The data are not on public record - there is no explicit description of the data or formal citation, so the dataset cannot be precisely identified. The existence of the data is not independently verified, and there is no guarantee they and information about them will continue to exist and be available. Access to the data depends on an applicant being able to locate the author (who may have moved on, retired or died), on the author being willing to supply the data in a timely fashion, on the author being able to match the data supplied to the data previously described and now requested, and on the data being retrievable by the author and in an uncorrupted state. Given this chain of dependencies, the probability of the data becoming undiscoverable and inaccessible steadily increases as a function of time elapsed. A [study published in 2014](#) found that the odds of being able to access data associated with published studies fell by 17% per year, with broken email addresses and obsolete storage devices being the principal causes of access failure.

For data to be Findable and Accessible, sufficient information needs to be published that they can be explicitly identified, located and accessed; this information, and the datasets themselves, need to be persistent over time; and the means of providing access needs to be organisationally managed and procedurally defined, so they are not at the mercy of a single point of failure.

### Interoperable

This means that information about the data has to be published in machine-readable formats, i.e. as an online structured metadata record using standard vocabularies or ontologies to record metadata elements.

Machine-readability should extend to the data object itself as far as is possible. This may include storing data in open and editable file formats with semantic encoding, and not proprietary formats with non-transparent or non-semantic encoding. For example: graphical and tabular data are often made available as supplementary information alongside journal articles in PDF format. This is a near useless format for storage of structured quantitative data, because it does not enable the data to be easily extracted, edited and analysed. Another example: although Microsoft Excel files can be opened in any number of software applications, and can be exported to XML format, embedded formatting and formulas may be lost in translation. It is preferable to preserve data in open formats, such as CSV for tabular data, which are universally accessible and do not contain embedded components that may fail to function in some applications.

## Re-usable

Even supposing a data file is made retrievable and technically accessible, it may still be unusable.

Imagine a table of values, with rows for participants in a study and columns for variables. Can the user unambiguously define the variable from the column header? Are the units of measurement specified? How are missing values recorded? Have values been rounded up, or averaged from several measurements? Are these all the data, or have anomalies and outliers been removed, and if so, by what criteria? What were the protocols followed to collect the data? What instruments were used? What additional contextual variables might be relevant? (e.g. where were the data collected? at what time of year? time of day? weather? was the subject fed or fasting?) What research question were the data collected to answer, and how have the data been analysed?

We can see that surrounding the raw data are various levels of information which enable you and other users to make sense of the data in different ways. To you much of this information will be tacit and may not need to be written down, but for another user, with no experience of the research context or methods, the information has to be made explicit.

Data must therefore be provided with sufficient information and supporting documentation to enable them to be understood and used.

To be made open and FAIR, data should be deposited in a data repository. This is a service that exists to preserve and provide access to research data. A data repository is a future-proofed vehicle for ensuring that data remain accessible and usable over the long-term. It is preferable to sharing data as supplementary files alongside a published article, or via cloud-based file storage services, or maintaining data in private storage and sharing on request only.

A data repository should not be confused with cloud-based services that provide file storage and sharing, such as GoogleDrive or the Open Science Framework. A data repository performs a number of specific functions:

- It actively preserves data, e.g. replicating and validating data files, migrating to preservation formats;
- It publishes metadata to enable online discovery;
- It assigns persistent unique identifiers (e.g. DOIs) to datasets and makes them citable;

- It quality-controls datasets and enhances metadata, e.g. by applying standard vocabularies (not all repositories do this);
- It manages access to data so that they can be used by other people;
- It applies licence notices, to make terms of use and attribution requirements clear.

Examples of data repositories include: disciplinary data centres and their component databases, such as [NERC data centres](#) and the databases of the [European Bioinformatics Institute](#); institutional data repositories; and general-purpose data sharing services, such as [Zenodo](#) and [figshare](#).

Where data are collected from commercial organisations, or where research is conducted in partnership with companies, it may be assumed that data cannot be shared. This is not necessarily the case.

Not all information provided by commercial organisations is commercially confidential, and companies may be willing for data provided by them to be made openly available - with redaction if appropriate.

Open publication of data is not necessarily an enemy of commercial objectives, and in fact may promote them. Corporations that are open with their data, and shown to be associated with prestigious research organisations, derive reputational benefits. Being open can be a valuable strategy for building trust and a basis for long-term collaboration. Many successful commercial businesses are based on [Open Source software business models](#). In some areas - for example, the pharmaceutical industry - the [transformative potential of Open Research](#) is already being actively discussed and explored.

It is acceptable to restrict access to data if they are commercially confidential or there is a commercial pathway for the research, for example involving an identified industrial partner. If IP protection may be sought, it should be possible to release data once protection has been confirmed.

Some datasets can be substantive research outputs in their own right. This may be the case, for example, with environmental observations or survey data, which are by their very nature unique and irreplaceable.

If you have produced a valuable open dataset in the course of your work, you can gain wider exposure for the dataset and receive academic credit as its producer by publishing a data paper. This is a peer-reviewed article, published in an academic journal, which describes a dataset that has been created in a research context.

A data paper can be an effective means of advertising a valuable dataset and encouraging others to make use of it and cite it. A data paper is also a citable



output in its own right, and is a means to ensure that proper recognition is given to those who were involved in creating the dataset. A data paper can also provide prospective users of the data with valuable information about how and why the dataset was created, how it has been used, and how it might be used or further developed.

Bear in mind that the primary purpose of the data paper is to promote re-use, and many journals will require the dataset described to be available under an open licence. Some standard licence restrictions, such as non-commercial terms of use, may be unacceptable.

An example of a software paper published by University members is provided below.

There are various [journals that will publish data papers](#), including dedicated data journals and 'mixed' journals, which will publish both data papers and conventional research articles.

Examples of dedicated data journals are: [Data in Brief](#), [Earth System Science Data](#), [Journal of Open Archaeology Data](#), [Nature Scientific Data](#), [Open Health Data](#), and [Polar Data Journal](#).

These are examples of journals/platforms that will also publish data papers: [F1000Research](#), [GigaScience](#), [PLOS ONE](#) and [Wellcome Open Research](#).

## Open Peer Review

Traditionally, peer review for research outputs has operated using a closed model where the author of the output was not aware of the identity of the reviewer. This is known as 'blind' or closed peer review. There are variations on this model - double blind peer review is when the identity of the author is hidden from the reviewer and the identity of the reviewer is hidden from the author. In practice, due to the narrow fields in which some researchers work, it is often possible for both the reviewer and the author to guess each other's identities.

Pros of traditional model	Cons of traditional model
Reviewers can be open and frank in their reviews	Reviewers can be rude and negative in their comments on an output as they will not be identified to the authors

Double blind peer review can reduce reviewer bias	Reviewers may be biased
Early career researchers can comment anonymously on the work of more established researchers without fear of recrimination	Reviewers may deliberately delay publication if the work under review may scoop their own
	Reviewers may be influenced by the standing of the author in the community

In order to make peer review fairer, transparent and less open to bias, various models of open peer review have evolved. In some cases the identity of the reviewer is only revealed when the decision on the research output has been taken. In others, the identity of the reviewers and the content of their reviews are published alongside the final published article so that the reader can make their own judgement on the quality, rigour and fairness of a review. There are many variations on the open peer review model; [a study in 2017](#) identified 22 different combinations of 7 basic elements of open peer review:

1. Transparency in the identity of reviewers and/or authors
2. Publication of the content of the peer reviews (sometimes combined or edited)
3. Opening up peer review to a wider community of interested readers
4. Allowing interactions between authors, editors and reviewers to make peer review more collaborative and constructive
5. Open peer review prior to publication by the use of preprints
6. Enabling post-publication commenting so that readers can make comments and authors/other readers can respond
7. Some platforms enable publication prior to peer review

Pros of open model	Cons of open model
Conflicts of interest are immediately apparent to authors and readers	Reviewers might not be as critical or rigorous as their comments will be visible to everyone

Readers can see how the work was improved via peer review by reading the reviewers' comments and authors' responses	Early career researchers may fear retaliation if they give an unfavourable review to a more established/influential researcher
Reviewers are more accountable for their comments	Some researchers will decline invitations to review openly as they are not happy for their comments or identities to be made public
Biased or inaccurate reviews are visible to readers and the authors of the research output	
Open reviews can be used as training material for the next generation of peer reviewers - essential if high quality peer review is to continue	
Direct communication between authors and reviewers can reduce confusion or misunderstandings and lead to more constructive and faster revisions	
Reviewers can earn credit and recognition for their contributions to the peer review process. If reviews are available and are issued DOIs they can be added to ORCID profiles and CVs	

## Reproducibility

Discussion of the 'reproducibility crisis' in scientific research has highlighted high rates of failure to replicate results of published studies. A [survey of researchers published in Nature in 2016](#) reported that more than 70% of researchers have tried and failed to reproduce another scientist's experiments, and more than half have failed to reproduce their own experiments. Research whose results cannot be

reproduced is unreliable and wasteful. In 2015 it was estimated that [irreproducible biology research costs USD 28 billion per year](#).

Various reasons have been adduced for low rates of reproducibility, including poor reporting of research methods, weaknesses in study design and statistical analysis, and failure to provide access to data and software code supporting published results.

Critics also accuse fundamental flaws in the academic reward system, which overwhelmingly values the rapid publication of novel results in high-impact journals, and lacks rigorous, systematically-applied reproducibility standards. Researchers are incentivised to take the shortest route to publication, to over-report significance and to under-substantiate results. It is argued that if the reward system were to put a higher premium on verifiability, and if researchers were more motivated to make the hypotheses, methods and data supporting scientific findings open, they would be more likely to produce reproducible and reliable research, and the levels of waste and risk of fraud would be reduced.

The case for reform is being actively promoted by many researchers across the empirical sciences. In [A manifesto for reproducible science](#) a group of concerned researchers propose a series of measures that can be taken by stakeholders in scientific research, including researchers, research organisations, funders and publishers, to improve research efficiency and the robustness of scientific findings.

Reproducibility begins with planning. Writing a Data Management Plan (DMP) at the outset of a project can help you to maximise the reproducibility of your research. Some funders (including most Research Councils, the European Commission, the Royal Society and the Wellcome Trust), will ask researchers to submit a DMP as part of a grant application. Advantages of writing a DMP are:

- It helps you to plan how the data you collect or generate will be managed both during the project and for the long term, and identifies at an early stage requirements that need to be addressed, for example, the need to obtain consent for data sharing;
- Where data are managed within a research group or in a partnership, it helps to document roles and responsibilities, so that data are managed efficiently and consistently to agreed standards;
- In collaborative research activities it can help to establish Intellectual Property Rights and data ownership, and permitted uses of the data by others, so that confusions or disagreements over ownership and use of the data can be avoided;

- It allows you to identify the costs of data management activities, which you may be able to recover through your grant.

In some areas of research, notably in the health and psychological sciences, practices are becoming established for the [registration of study hypotheses and protocols](#) in advance of undertaking the research. The rationale for this is to provide transparency about the research methods used, and to eliminate poor practice, such as hypothesising after the results are known ([HARKing](#)) and cherry-picking of results to 'create' or exaggerate significance. [Registration of clinical trials](#) is mandatory in many countries, and growing numbers of researchers are using platforms such as the [Open Science Framework](#) to register study protocols.

Public registration of hypotheses and protocols can establish the priority of a research approach and safeguard the integrity of results. Various models for introducing formal peer review of research processes into earlier stages of the research pathway have also emerged. This can increase the quality of study design and the reliability/reproducibility of results. It also provides a solution to the phenomenon of publication bias - where the decision to publicise or disseminate research is based on the perceived significance or interest of the results. A number of publishers now offer [registered reports](#) options, by means of which researchers can submit a study design for peer review and on acceptance receive a commitment from the journal to publish the final results.

To be transparent and reproducible, published research findings must be backed up by openly accessible supporting data and code. Supporting materials should be preserved and made available using suitable repositories, and referenced from related publications by means of a DOI citation.

## Open Collaboration

Online computing and research tools allow the researcher to provide direct public access to the research process. Websites, wikis and blogs, online research environments, and citizen science platforms can all be used variously to document and publish the primary processes and materials of research, and enable direct participation in research activities by wider groups of users.

Many of these tools create the possibility of a new kind of research, which extends beyond the closed group to a wider public, and enables the research process to be co-creative, massively collaborative, and to evolve in response to critical feedback.

The basic model of online open collaborative research can be applicable to all research domains, not just the sciences. There may be more specialised tools available for use by experimental scientists, but platforms such as Zooniverse and

collaborative tools can be just as effective in areas of arts and humanities or social sciences research.

At its most basic and universal, online open collaboration is built around generic online platforms such as blogs and wikis, which allow public access to and participation in research.

One of the foundational examples is the [Polymath Project](#) started by Cambridge mathematician Tim Gowers in 2009, a blog-based application of the crowdsourcing principle to the solving of mathematical problems, which demonstrated that problems could be solved much more quickly and efficiently if they were published and worked online, with multiple contributors bringing their own pieces to the puzzle and working together to complete the picture. This approach to solving scientific problems is discussed in Michael Nielsen's TEDx talk, [Open science now!](#)

The website, blog and wiki continue to be powerful tools for engaging audiences and involving people in research. They are well-suited to managing straightforward interactions. But they are not purpose-built to support research processes and have some limitations:

- They may be insufficiently dynamic or flexible to manage research workflows and complex collaborative interactions between multiple participants;
- They may lack version control, past state recovery and information export features, making it difficult to maintain a record of the research process, which may be essential for authentication and replication of results;
- They may lack key features such as central document storage, content management functions, and access controls, meaning they have to be used in conjunction with other services that provide essential components.

The concept of open notebook science was introduced in 2006 by the chemist Jean-Claude Bradley. It was explicitly related to the Open Source software model, and defined by the existence of 'a URL to a laboratory notebook that is freely available and indexed on common search engines. It does not necessarily have to look like a paper notebook but it is essential that all of the information available to the researchers to make their conclusions is equally available to the rest of the world.'

A wide variety of Electronic Lab Notebooks (ELNs) is available, from generic tools to those that are designed to work with specific types of experiment, scientific instrumentation or data types. Some of these ELNs will require local installation and/or local management, and may be offered as free/Open Source products or subscription services, but there are a number of services that are fully web-based

and available free to individual users or groups. An [excellent overview of products](#) is provided by the Gurdon Institute at the University of Cambridge.

Unlike paper-based lab notebooks, ELNs can be used to make experimental documentation openly accessible in a structured and usable format, either by export into document formats, or, in the case of some online services, by providing direct public access. Most ELNs have been designed around the model of a closed research group or project team, and so may not provide efficient workflows for making information publicly accessible or for enabling open collaboration. For example, the ELN [RSpace](#) allows documents or notebooks to be shared with members of a lab group and other RSpace users, but does not provide open collaborative access. It does have integrations with various popular cloud storage services such as Dropbox and OneDrive, and with the online collaborative tool [Slack](#), but does not allow the entire project to be shared as does the [Open Science Framework](#).

The collaborative protocol tool [protocols.io](#) applies the version control model of a code repository platform such as GitHub to the experimental protocol. Protocols can be collaboratively developed in a closed group, and then released in public versions, which are assigned DOIs so that they can be cited from related publications. The public versions can be directly commented, but also forked (i.e. cloned) and modified, allowing for iterative and version-controlled open development and refinement of experiments.

The [Open Science Framework](#) is a full lifecycle research management platform, run by the non-profit [Center for Open Science](#). It provides:

- dashboard-based project management functionality, with access controls for closed and public collaboration, version control features, and project analytics;
- a central document store with file sharing and version control;
- integrations with Box, Dropbox, GoogleDrive and Amazon Web Services cloud storage and compute, with GitHub for code management, with figshare and Dataverse for data repositories, and with Mendeley for reference management;
- a pre-registration function for publishing time-stamped study designs;
- a preprint server for rapid communication of results.

OSF has established itself as a popular platform, particularly in the health and social and behavioural sciences. This is due both to its usability as a total research environment, and to the role of the Center for Open Science as a champion of

Open Research, notably through high-profile interventions such as the [Reproducibility Project](#) undertaken by COS founder Brian Nosek and colleagues, and through its development and advocacy of solutions for more reproducible and efficient science, including study [pre-registrations](#) and the [registered reports](#) publication model.

Citizen science is [defined in the OED](#) as 'scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions'. There is no reason why this model of research should be confined to the sciences, although it is here that it has become most well-established. We could expand our definition to include all disciplines, and speak of citizen research or citizen scholarship.

There has also been growing use of online technologies in support of citizen science and public engagement projects, such as those hosted by [Zooniverse](#), where projects that have large amounts of data in need of human analysis can leverage the processing power of the online crowd. This model of research is particularly suitable for projects that require basic analysis or processing of large amounts of data which cannot be undertaken by computer, for example, identifying features or patterns in images, or transcribing images of hand-written texts.

Online citizen science projects can facilitate reproducibility, open up new avenues of research, and lead to new insights. The 'wisdom of the crowd' principle can be used to mitigate human error by taking an average of values and eliminating anomalous outliers. Citizen scientists can identify new features in data, or be inspired to ask new questions and formulate new ways of solving problems.

## Open Research Culture

Everyone, from students to professors, can play a role in fostering the growth of an Open Research culture. You can help to establish norms of best practice by exemplifying them in your own behaviour. You can influence your colleagues, your students, and the wider network of your peers. You can speak up for the highest standards of Open Research.

- If you are part of a project team, or research group, start (politely) asking questions: What is our policy on data sharing? Does our project have a Data Management Plan? How do we manage and share code? Could we publish our findings as a preprint? Could we pre-register our study design, or submit it to a journal as a registered report? Perhaps you could table a discussion at a team or group meeting.



- If you are responsible for teaching, introduce your students – undergraduates as well as graduates – to the concepts and practices of Open Research. For example: explain why Open Access, and data and code sharing are important; use open data in your teaching and exercises; ask students undertaking experimental projects to pre-register their hypotheses and study designs; teach reproducibility by setting an assignment to replicate a published study; get students learning programming to set up an online code repository in [GitHub](#); set up a preprint club and run an open peer review exercise.
- Use social media and other research communications channels to publicise your open outputs and discuss Open Research issues. Don't just tweet your articles - tweet your open datasets, and your open source code as well. Start or contribute to a discussion in your network about Open Research issues.
- When you read an article, check for a [data access/data availability statement](#): have supporting data and code been shared? If not, and the supporting data are of interest, why not (politely!) ask the corresponding author to share them with you; or, even better, to deposit them in a suitable public repository? Let other people know that data and code sharing is a norm and an expectation.
- There are always opportunities to get involved in projects or initiatives to develop open standards and tools that support open practices in your discipline. For example, anyone can join the [Research Data Alliance](#) and participate in various interest and working groups developing community standards for data and metadata in specific disciplines.
- Use your involvement with research stakeholders (such as learned societies) to promote Open Research activities and policies.
- If you sit on the editorial board of a journal, consider tabling these issues for discussion if policies have not already been debated or adopted:
  - introducing a data and code availability policy ([see example](#));
  - introducing an open peer review submission system and preprint-friendly policy;
  - offering a [registered report](#) option;
  - [converting the journal to a fully Open Access model](#), if it is subscription-only or hybrid Open Access.

## Additional Resources

- [Framework for Open and Reproducible Research Training](#)  
FORRT provides a pedagogical infrastructure & didactic resources designed to recognize and support the teaching and mentoring of open and reproducible science.
- [Open Science Toolkit](#)  
The UNESCO Open Science Toolkit is designed to support implementation of the UNESCO Recommendation on Open Science. The Toolkit is a set of guides, policy briefs, factsheets and indexes.
- [Open Science MOOC](#)  
A free online resource designed to help equip students and researchers with the skills they need to excel in a modern research environment. It is product of an ongoing international collaboration of hundreds of researchers and practitioners who are committed to furthering the progress of Open Research.
- [FOSTER Open Science](#)  
The FOSTER portal is an e-learning platform that brings together the best training resources addressed to those who need to know more about Open Science, or need to develop strategies and skills for implementing Open Science practices in their daily workflows.
- [Open Science: Sharing Your Research with the World](#)  
A MOOC on Open Science from TU Delft, covering general principles of open science, research data management, Open Access publication, and using social media to increase your visibility.
- [Open Science Knowledge Base](#)  
A comprehensive knowledge base designed to serve as a practical, hands-on introduction and reference resource for budding and veteran open scientists.

## OER Knowledge Cloud



An essential resource for the open education researcher, OER Knowledge Cloud (<https://www.oerknowledgecloud.org/>) is a curated database and repository of research papers.

More than 2700 publications are included in The Cloud, mostly coming from the last twenty years of scholarly activity. You can explore thematically, geographically, by publication year, or by author.

blended learning case study collaboration connectivism copyright course material Creative Commons  
 distance education e-learning education educational technology government policy **higher education**  
 instructional design K-12 learning design learning material learning objects Lifelong Learning literature review  
 massive open online course massive open online courses **MOOC** MOOC research **MOOCs** OEP **OER**  
 OER adoption OER creation OER policy OER quality OER research online education online learning  
 open access OpenCourseWare **open education** open educational practices  
**Open Educational Resources** open learning openness open textbooks pedagogy policy  
 professional development research reuse sustainability textbooks web 2.0

The Cloud data includes searchable records of journal articles (eg. papers in periodicals), reports (eg. from government or industry), books or other items in any medium. These items are available either directly from the Cloud repository or by links to their sources. Athabasca University Library provides OER Knowledge Cloud as a repository for all data related to open educational resources and the source of electronic copies of many references.

The Cloud's documents will be of enduring value to the OER community of researchers and scholars, industry and government, writers, historians, journalists and informal learners. By providing free access to research initiatives, data and other information on all aspects of open educational resources, the OER Knowledge Cloud enhances research opportunities and access to knowledge, removing barriers, opening up scholarship and making research universally accessible.

## OER Research Toolkit

The OER Research Toolkit is provided by the Open Education Group. The Open Education Group is an interdisciplinary research group that (1) conducts original, rigorous, empirical research on the impact of OER adoption on a range of educational outcomes and (2) designs and shares methodological and conceptual frameworks for studying the impact of OER adoption. They also teach courses in topics relating to open education.

The OER Research Toolkit consists of the OER Research Guidebook and several additional resources. We reproduce links to the content here. You can also find examples of research produced by the group at <https://openedgroup.org/publications>.

- OER Research Guidebook  
<https://openedgroup.org/wp-content/uploads/2016/08/OER-Research-Guidebook.pdf>
- Open Education Group Student Survey  
<https://openedgroup.org/wp-content/uploads/2016/08/Bliss-Student-Survey.docx>
- Open Education Group Faculty Survey  
<https://openedgroup.org/wp-content/uploads/2016/08/Bliss-Student-Survey.docx>
- Faculty Survey  
<https://openedgroup.org/wp-content/uploads/2016/08/Selection of required course materials A faculty survey survey questions-1.docx>
- OER Hub Student Survey  
[https://openedgroup.org/wp-content/uploads/2016/08/OER\\_Hub\\_Student.pdf](https://openedgroup.org/wp-content/uploads/2016/08/OER_Hub_Student.pdf)
- OER Hub Faculty Survey  
[https://openedgroup.org/wp-content/uploads/2016/08/OER\\_Hub\\_Teacher.pdf](https://openedgroup.org/wp-content/uploads/2016/08/OER_Hub_Teacher.pdf)
- Digital Open Textbook Questionnaire  
<https://openedgroup.org/wp-content/uploads/2016/08/Digital-open-textbook-questionnaire.docx>
- Sample Data Collection Template with Definitions  
<https://docs.google.com/spreadsheets/d/13QSEg7YSEUsR7CyNKORMssCto9xCscPt2p0nqYAsDIg/>

## COUP Framework

The COUP Framework is the Open Education Group's approach to studying the impact of open educational resources (like open textbooks) and open pedagogy in secondary and post-secondary education. COUP stands for:

- Cost
- Outcomes
- Usage
- Perceptions

### Cost

The adoption of Open Educational Resources can impact a range of financial and cost metrics for students and institutions. Proponents of OER frequently claim that using these resources instead of traditional publisher textbooks or digital materials will save students money in the post-secondary context and will save organizations money in the K-12 context. There may also be other financial impacts, like changes in bookstore revenues and tuition revenues. The Cost strand provides empirical evidence about the magnitude and direction of the financial impacts of OER adoption:

- Costs of textbooks previously assigned
- OER support fee models
- Changes in campus bookstore revenue
- Changes in tuition revenue due to changes in drop rates
- Changes in tuition revenue due to changes in enrollment intensity
- Changes in tuition revenue due to changes in persistence
- Changes in access to performance-based funding due to changes in drop, enrollment intensity, and persistence

### Outcomes

Given the folk wisdom that "you get what you pay for," some individuals and organizations worry that student learning will necessarily suffer when students use freely available, openly licensed resources instead of \$200 textbooks. OER proponents claim that using these resources instead of traditional publisher textbooks or digital materials increases student access to critical learning materials and expands faculty's academic freedom, consequently improving student learning

outcomes. The Outcomes strand of our work provides empirical evidence about the magnitude and direction of the learning impacts of OER adoption:

- Changes in the percentage of students receiving a C or better
- Changes in rates of completion
- Changes in drop rates
- Changes in enrollment intensity
- Changes in persistence
- Changes in attainment of progress milestones (e.g., first 15 credits)
- Changes in graduation rates

## Usage

The permissions provided by open licenses allow students to use OER in a range of novel ways – for example, updating a history textbook based on recent events. Likewise, the permissions provided by open licenses allow teachers to engage in new pedagogical practices. Proponents of OER frequently claim that improvements in student learning outcomes will be highly correlated with the degree to which students and faculty exercise the permissions offered by OER. The Usage strand of our work provides empirical evidence about the ways faculty and students use OER and the degree to which impacts on learning outcomes covary with these uses. We operationalize the idea of ‘exercising the permissions granted by open licenses’ by determining the degree to which students and faculty engage in activities described in the DIME model of OER adaptation:

- Deleting material from the OER
- Inserting other open material inside the OER
- Moving material around within the OER
- Editing material in the OER

## Perceptions

What do faculty and students think about, and feel toward, Open Educational Resources? How do they judge their effectiveness relative to traditional textbooks? Their rigor and coverage? Do they find the formats, structures, and other design features easy to use? Frustrating? What about other stakeholders, like parents or policy makers – what are their thoughts and feelings toward OER? The Perceptions strand of our work provides empirical answers to these questions.

Additional resources:

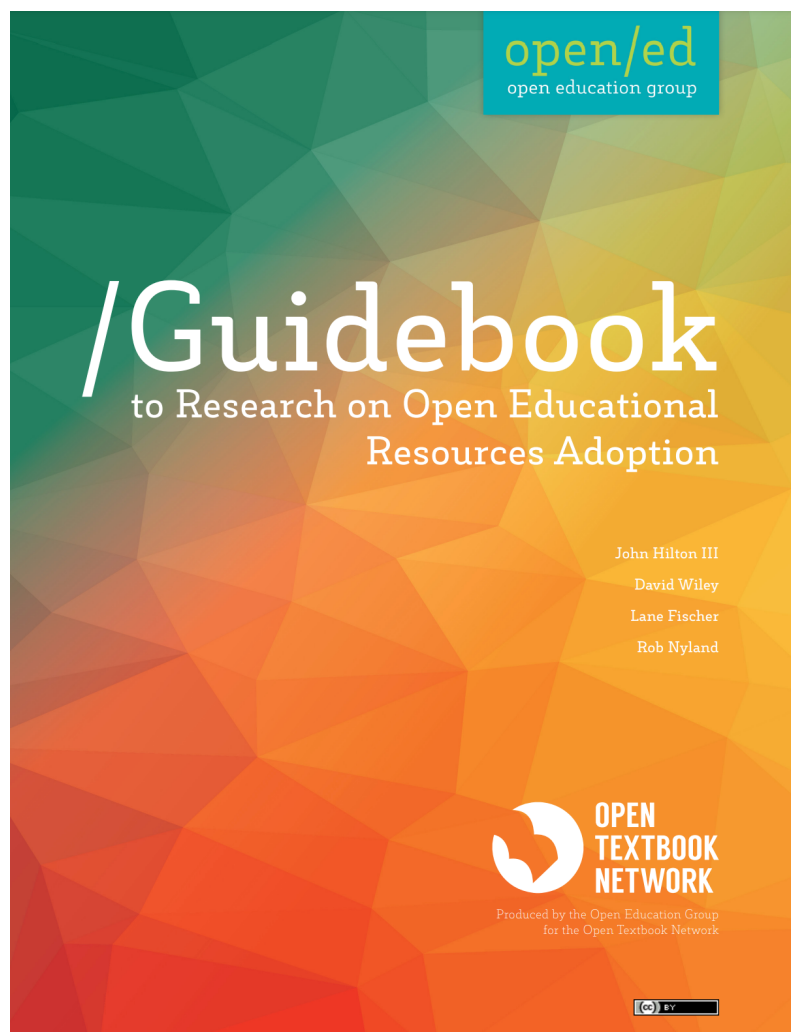
Wiley (2019) has provided a calculator for assessing the impact of adopting OER  
<https://impact.lumenlearning.com/>

“Faculty Planning” by Open Education Consortium, licensed under [CC BY 4.0](#)  
<https://www.cccoer.org/planning/department-plans/>

“Guidebook to Research on Open Educational Resources Adoption” by [Open Education Group](#), licensed under [CC BY 4.0](#)  
<http://openedgroup.org/wp-content/uploads/2016/08/OER-Research-Guidebook.pdf>

“The COUP Framework” by [Open Education Group](#), licensed under [CC BY 4.0](#)  
<http://openedgroup.org/coup>

## Guidebook to Research on OER Adoption



<http://openedgroup.org/wp-content/uploads/2016/08/OER-Research-Guidebook.pdf>

This guidebook provides a thorough grounding in techniques for understanding different dimensions of OER impact by leading scholars. Using the approach recommended can produce data that is directly comparable with many studies.

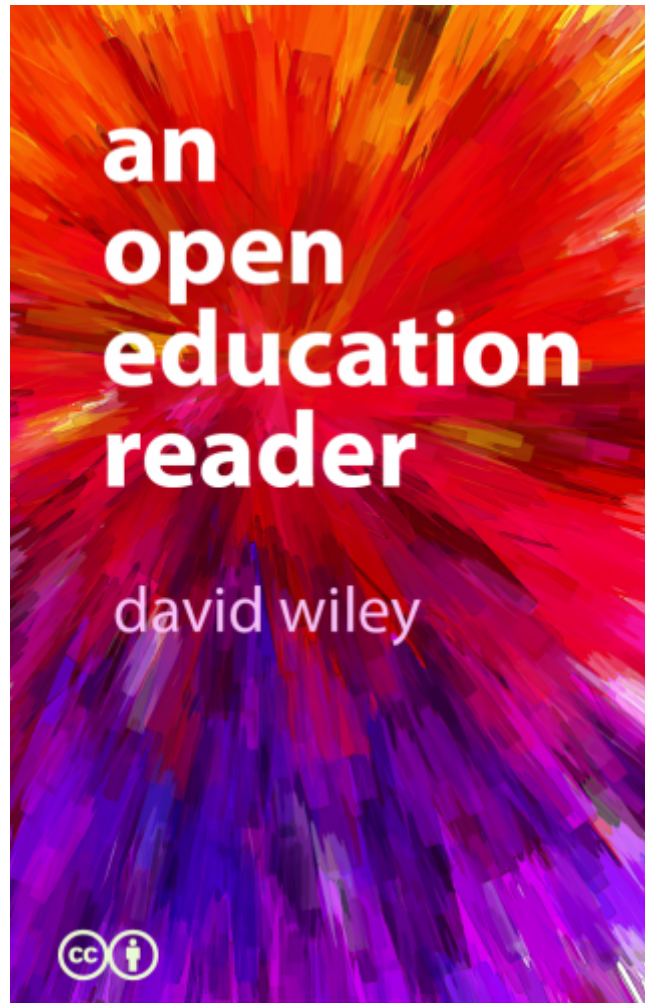
The purpose of this guidebook is to provide ideas for how individual faculty members and those who support them (e.g., librarians, instructional designers, etc.) can research the effect of their adoption of open educational resources (OER). Clearly educational research is a challenging enterprise; this guidebook is not meant to replace the substantive courses and experiences that a PhD in educational research would provide. Rather, our hope is to provide some straightforward



suggestions that could be implemented by OER adopters so as to help them identify what has happened as a result of their OER adoption.

Hilton (2016) summarizes and critiques several OER studies that have been done and may be a helpful additional resource for designing your own research study. More up-to-date summaries of OER impact research can be found at <http://openedgroup.org/review>. In addition, the appendix of this document provides a refresher on basic principles of educational research design.

## An Open Education Reader

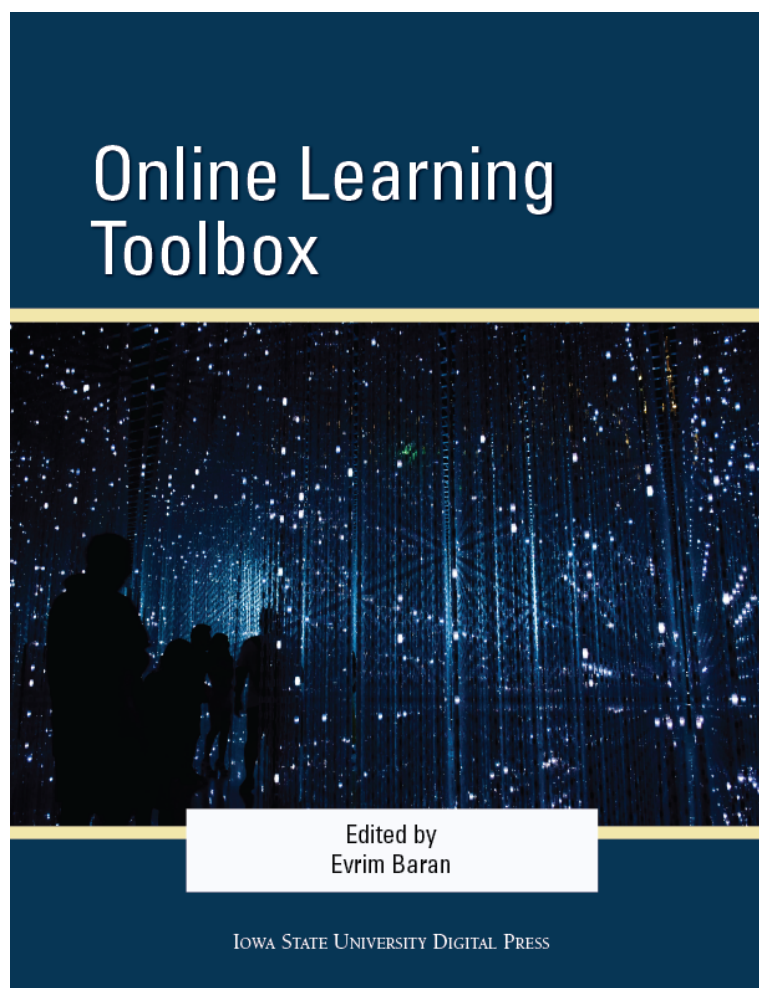


<https://openedreader.org/>

This volume comprises a collection of readings on open education with commentary. It was originally created for *IPT 515R Introduction to Open Education*, a graduate course at Brigham Young University in the USA.

A wide range of topics are covered in the reader, covering the theoretical foundations of openness as well as the application of open approaches in a variety of OER and aspects like business models.

## Online Learning Toolbox



<https://iastate.pressbooks.pub/onlinelearningtoolbox/>

Edited by Evrim Baran, this collection combines seminal readings for online learning with commentary and summaries. It was produced by students taking the EDUC-507: Principles and Practices of Distance Education graduate course in Fall 2019 at Iowa State University according to the principles of open pedagogy.

Topics covered include: Open Education, Self-Regulation in Online Learning, Online Learning Communities, Engaging Online Learners, Online Learning in K-12, Social Media and Online Learning, Massive Open Online Courses (MOOC), Effective Feedback in Online Learning, Accessibility & Universal Design of Online Education, Community of Inquiry Emotions in Online Learning, Assessing Online Learning, Online Learning Interaction, Online Discussions, and Evaluating Online Education.

## Open Research (P2PU)

This section reproduces the open textbook *Open Research* based on the two iterations of the award winning open course by the same name which was facilitated by the Open Education Research (OER) Hub during 2014 and 2015. Thank you to everyone who participated in the facilitated versions of the course, and for your contributions and suggestions. We have retained the original feel of the original 4-week course here but have revised and updated some material for the text based version. In addition, we have included many of the insightful contributions from participants and also suggest group activities so that you can use this content to facilitate discussions with students, colleagues or friends.

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If you have an interest in openness, open education, research skills or want to find out more about the impact of Open Educational Resources (OER), then this resource is for you. You could be:

- Using an OER with students and interested in assessing its impact
- Facilitating sessions on open practice with students or colleagues and looking for inspiration
- Working on a research project and wanting to find out more about incorporating open research techniques into your own practice
- Curious about the benefits and challenges of open research
- Looking to use open tools in your research
- Wanting increased impact for your research
- Interested in open research on OER

This resource will help you explore what open research is, how you can ethically and openly share your findings so others can reuse or develop your work, and the role of reflection and open dissemination. Whilst many challenges and issues apply to all aspects of research (for example choosing an appropriate methodology), open research brings a range of different opportunities and challenges; it's these that we are specifically interested in exploring. What can openness add to the research process?

This content encourages you to:

- Understand what it means to conduct research openly and the benefits of doing so
- Understand the key challenges that can arise when researching in the open and how to address these
- Use open resources that will assist with planning your research project (however large or small!)

- Learn about best practice for sharing your research and how you can contribute to an international understanding of the impact of OER

Activities have been structured so that you can use your preferred method of tracking your progress through material. You might want to blog your reflections as you progress through the course. Or perhaps you'd prefer to use an online or hardcopy notebook. If you're working as a group, maybe you'd prefer to brainstorm your ideas collectively and take photos of what you produce as a record. The choice is yours!

Following most of the activities you will find a commentary which includes topics you might want to consider and a selection of example responses mainly drawn from participant contributions. These can be used with their accompanying activity to stimulate individual and group reflection or to structure and facilitate group discussion.

In this chapter we'll be thinking about what open research is. In what ways does open research differ from traditional research? What kind of benefits could open research bring? What kind of challenges might an open researcher encounter? You'll also have the option to explore open tools you could use to help conduct your research.

We'll be thinking about what open research is. In what ways does open research differ from traditional research? What kind of benefits could open research bring? What kind of challenges might an open researcher encounter? You'll also have the option to explore open tools you could use to help conduct your research. By the end of this chapter you will be able to:

1. Understand what it means, and how, you can conduct open research
2. Be able to structure your own open research project
3. Understand some of the challenges and benefits of different aspects of open research

## Understanding Openness

As we mentioned in the introduction, as researchers we are interested in the impact of open education resources (OERs) that are being used within an educational context. OER are resources which are often available online, can be remixed and repurposed, are available in the public domain and are usually openly licensed. The Hewlett Foundation describes OER as:

*OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. Open Educational Resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge. ([Source](#))*

#### Activity 1: Openness (10 minutes)

Openness is not just applicable to research. You can practice openness in lots of different contexts. As you can imagine there are lots of different ways to define openness. Take a moment to think about what you think 'openness' means.

If you are interested in finding out more about debates around the meaning of openness, check out another School of Open course [Why Open?](#)



*[“Is Licensing really the most important question for OER?” \(CC BY-SA 2.0 Generic, \[opensource.com\]\(#\)\)](#)*

There was a wide range of responses from course participants which reflected a range of interconnected ideas about the meaning of “open.” In summary:

- Sharing was highlighted as an important aspect of openness and can be linked to the idea of openness as a practice. Releasing your material into the open, making it available for comment and reuse and letting people know how you would like it to be used and attributed (e.g. through open licensing) were all highlighted as important aspects of this

- Openness was associated with increased visibility and usability through there being “no barriers” to reuse and minimal or no technical barriers
- There was some discussion around whether releasing material in the open entailed loss of ownership of that resource. A distinction between “authorship” and “ownership” was noted to highlight that open licensing requires you to attribute the creator of a resource, for example
- Transparency and honesty. By sharing resources and material in the open you are enabling others to comment on your material and inviting feedback
- Openness was also highlighted as a potential “social justice enabler” by removing the cost to access resources, for example
- Openness was associated with a loss of control as the impact and reuse of materials cannot be controlled. However this was also viewed as exciting as it could lead to serendipitous outcomes and exchanges
- Other types of open were also highlighted in discussion, e.g. open access or open licensing

Selected participant contributions which explore one or more of these ideas:

- “Openness, In the first instance, for me, is about ‘being open’; that is, being open as opposed to simply making open resources ...openness requires the ability to be vulnerable, indeed super-vulnerable; either learning or making, it is after all in the open. Cameron Neylon makes this point that it’s also about humility, in that the author of open resources, despite being supremely knowledgeable about their work or resource, can’t predict the use and application to which your work might be put (for better or worse)”
- “For me, openness means an honesty about the messiness of research and transparency in methods and process that helps both the researcher and the audience. It helps the researcher by allowing others to comment and get involved in the research earlier if they spot flaws in the methodology or process, and the audience by showing (especially junior or first-time researchers) that research is rarely a clean progression from simply-defined goals to a final research output, and instead involves reworking and change as certain aspects of the originally-scoped research may become untenable or new areas prove to be more interesting or researchable”



- “For me openness is a way of thinking and a way of being in one’s professional capacity. It has both ‘negative’ and ‘positive’ aspects – ‘negative’ in that it is about removing barriers to knowledge or resources e.g. removing paywalls thus giving access to research, knowledge, data, or ideas, while the ‘positive’ is that openness is an enabler and actively giving permission to be able to use, revise and repurpose through say CC licences – which is then remixed and reshared thus perpetuating a constant state of openness.”

## What is Open Research?

### Activity 2: Thinking about open research (15 minutes)

Let’s focus on the idea of openness in research. How is open research different from other kinds of research? What characteristics does it have? What tools and methods does it adopt? Explore the [School of Open site](#), look at some of the resources below or think about your own experiences. When you are ready, develop a brief definition of open research.

We’ll be exploring openness in research in more detail as the course progresses, so don’t spend too long creating a definition, the aim is to just to get you considering open research.

### Resources:

- [Why openness benefits research \(blogpost\)](#)
- [“The Impact of Impact”](#)
- [Right to Research Coalition: Open Research Glossary](#)
- [The Open Science Project](#)
- [Wikipedia Definition of “Open Research”](#)
- [Open Science Framework \(OSF\)](#)
- [Open Research Exchange](#)
- [Open Data for Development](#)

How do you think openness might change the way in which you research? Think about the kind of research interests you have and the research you conduct. When could open research be important in this context? Openness in the research process can occur at any point and is often ongoing through the duration. Some thoughts and ideas about open research:

- Open research is the sharing not just of outputs at the end of a project, but also throughout the duration of a piece of research. It can include the sharing



of methodologies, data and other tools

- By publishing methods, findings and other aspects of your research as you go along, there is the opportunity for others to comment, advise and engage with your research as you go along, and not just at the point of publication. Open research could therefore be described as enabling collaboration
- There is an ethical obligation to conduct open research, especially in instances where research has been publicly funded

There's another aspect to Open Research, and that is the sharing of interim outputs in the case of long-term projects. Especially for those that deal with large amounts of statistical data and occur over several years, it's possible to provide greater value to the public by releasing interim stats, figures of findings before the project has come to an end. This of course raises the importance of adequate and understandable metadata so that end-users of the research know exactly what time-periods those statistics refer to.

## Open Research For Others

Activity 3: What open research means to others (30 minutes)

Explore the three sets of short video clips at <https://pressbooks.pub/openresearch/chapter/section-one-open-research/>. Write down your thoughts and responses to the following questions:

1. What do you think the key points are?
2. Where do you think openness made a difference to the research process?
3. Which examples (if any) seem most compelling to you? Why?

*You can read more about the contributors and their work by clicking on their name.*

*These videos are subtitled and you can also [download a transcript of all the videos](#).*

As you've moved through this section of the course, you've probably become aware that increasing transparency, sharing and collaboration (some of the key aspects of open practice) can impact on every stage of the research process. Let's take a look at participant responses to get a flavour of people's thoughts on the academics and researchers interviewed:

- “The most compelling examples to me were from Cheryl Hodgkinson-Williams and Martin Weller, about what ‘opening up the research process’ really means – it means having your proposal, your literature review, your conceptual frameworks and why you chose them, your methodologies, your research instruments and your data all fully (or partially?) available. Is this a bit risky / too time consuming for a newbie researcher or a perfectly achievable PhD goal, with the right planning? These are the thoughts that occupy me at this stage, learning from everyone else :-)”
- “The ability to have feedback early on can really strengthen your research because you get the chance to see whether or not your research stands up to criticism early rather than later. If your statistical analysis methods aren’t good, someone may notice and tell you about it before you’ve sent it for publishing. Each person has biases and blind spots, and the ability to open the research allows others to point those out before you go down the wrong road. An additional point: open research has the ability to greatly transform what would be considered “negative” research: research where you don’t get the intended result or you get a bad result (for example, pharmaceutical tests). Without the requirement of publication in a journal, you can access what didn’t work.”
- “The importance of research ethics and the doubts about whether there is a danger of being plagiarised appears to be the main concern. At the same time, there are definite and measurable advantages to researching in the open. Mainly I picked up on three advantages: first the peer review that is ongoing during the research; second the additions to the project from other interested parties, notably the addition of unrecognised benefits to a project; and finally the time saving ultimately due to the development of much larger networks that is not possible otherwise. It is important to note that open research does not preclude publishing if that is the final objective of the research project. The advantages of open research seem to outweigh the disadvantages.”
- “Open research enables small-scale research, often with novice researchers, to happen more easily.” To find out more about Guerrilla Research see [https://nogoodreason.typepad.co.uk/no\\_good\\_reason/2013/10/the-art-of-guerrilla-research.html](https://nogoodreason.typepad.co.uk/no_good_reason/2013/10/the-art-of-guerrilla-research.html).

## Setting up a Research Project

Now that we've talked a bit about what open research means, let's delve a little deeper and look at the research process itself.

### Activity 4: Advantages and Challenges of Open Research (20 minutes)

For each of the different activities/considerations you need to think about when conducting research, in what ways (if any) do you think you can be 'open'?

For example, what will happen to the data you collect as part of your research? Will you release the data with any research papers you write? Or will you make the data available once it's been collected and analysed?

Choose two stages in the research process and answer the following questions in relation to your chosen activity/consideration:

- Do you think you can be 'open' at this stage in the research process?
- In what ways do you think you can be 'open'?
- What are the advantages of being 'open' at this stage in the research process?
- What are the challenges of being 'open' at this stage in the research process?
- How could you resolve any challenges?
- Any further thoughts/comments?

You can also review some of the [responses to this activity from previous participants](#).



*"Common Good" on Graffiti Wall at OKFest14, Berlin*  
[CC BY 4.0 International, Beck Pitt](#)

## Why Open Research?

Now that we've explored how openness might impact on different research processes and practices, let's explore why you might consider incorporating open practices into your research. For example, if you publicly report on the progress of your research and your findings as the work progresses, your research might be exposed to a wider audience than if you waited to publish a final paper after you had finished your research project. Your work could also receive useful feedback and comments from others that help you develop your ideas and research plan.

You might decide that you want to release your findings more formally, e.g. write a journal article. PhD Comics has produced a video (8-9 minutes) called "Open Access Explained!" which gives useful background information and explanation of why open matters even more than before (Clue: the Internet and the massive increase in the cost of research publications). The video is available [here](#).

As EIFL, who work with librarians in the developing world to promote digital literacy and who have a sub-project that promotes open access, succinctly describes it:

*For researchers, open access brings increased visibility, usage and impact for their work. A number of studies have now been carried out on the effect*

*of open access on citations to articles, showing the increased citation impact that open access can bring. Open access repositories also provide an excellent means for researchers to boost their online presence and raise their profile. ([Source](#))*

EIFL have a full list of FAQ relating to open access available [here](#).

Sharing and moving toward a more open model of research potentially has benefits for everyone. Open Economics have produced an article "[The Benefits of Open Data...](#)" which has wonderful examples of the way in which openness helps those in developing countries. In another article, which focuses on research in economics, Guo Xu presents "hard evidence" of the ways in which open research practices have helped those in developing countries, particularly in relation "...to reducing corruption and lowering the cost of information."

### *Further Reading*

- Researchers Sharing Data was Supposed to Change Science Forever. Did it? [http://www.slate.com/blogs/future\\_tense/2015/06/24/darpa\\_s\\_biology\\_is\\_technology\\_conference\\_discusses\\_problems\\_with\\_open\\_source.html?wpsrc=share\\_all\\_dt\\_tw\\_top](http://www.slate.com/blogs/future_tense/2015/06/24/darpa_s_biology_is_technology_conference_discusses_problems_with_open_source.html?wpsrc=share_all_dt_tw_top)
- The Battle for Open: How openness won and why it doesn't feel like victory <http://www.ubiquitypress.com/site/books/detail/11/battle-for-open/>
- To what are we opening Science? Reform of the publishing system is only a step in a much broader re-evaluation <http://blogs.lse.ac.uk/impactofsocialsciences/2015/04/21/to-what-are-we-opening-science/>
- ODDC: Exploring the emerging impacts of open data in developing countries <http://www.opendataresearch.org/emergingimpacts>
- Opening Data in Montevideo: A bottom up experience <http://www.opendataresearch.org/content/2014/574/opening-data-montevideo-bottom-experience>

## Ethics in the Open

As part of their training, all researchers learn about how to collect, manage, analyse and disseminate data. This section covers some of the things they typically learn about ethics. It is not intended to replace formal training in research ethics although some training modules like these are available openly and will be referred to later. We'll work through the process in stages.

As we will see, openness can raise problematic cases for traditional approaches to research ethics but also offers novel research possibilities. Our focus here will be on the differences openness can make to these research practices.

- An overview of ethics and its role in research
- Developing a better sense of ethical frameworks and how they are applied
- Applying these frameworks in traditional and open approaches across the life of a research project
- Reflection on the process of institutional approval for research and legal compliance
- Creating tools for evaluating ethical risks in a research project and identifying appropriate action(s)



*"Moral Compass Pin"* (CC BY 2.0 Generic, [Paul Downey](#))

## The Importance of Research Ethics

Most of the interesting questions in life are about people, and as a result a lot of research is done into people: how they behave, what they think, and how they learn and communicate. As a subject for research, human beings are of course quite different to a chemical in a test tube or a rock sample. The moral value of human life requires us to treat others with respect for their wellbeing.

Watch the following short video: Robert Levine (Yale School of Medicine) on the importance of ethics for research involving human subjects  
[https://www.youtube.com/watch?v=jD-YCDE\\_5yw](https://www.youtube.com/watch?v=jD-YCDE_5yw).

### Activity 5: Thinking about research ethics (20 minutes)

What kind of research do you want to do? What might the impact on human subjects be? Think of three ethical issues that might be raised by the research you want to carry out.

There are lots of different potential reasons that research ethics are important. Some of the reasons people gave when we ran the moderated version of the course included:

- Understanding the ultimate impact of our work on humans, and especially the capacity to cause physical or psychological harm through experiment
- Ethical use of time, especially if working with others
- Trying to get the best “impact” from research activity
- Aspiring to professionalism in research practice: protecting participants; improving skills; promoting reliability and validity
- Understanding what kinds of open and public data can be used ethically in research
- Responding to the evolving ethical and practical challenges presented by new technologies: open data; social networking; privacy; anonymity; etc.



These are all good answers, some more pragmatic in focus than others. At the practical end of the spectrum we'll be looking at specific guidance shortly. But for now it might be good to reflect on the idea that research ethics is a very recent field – and one that was founded in recognition of the profound importance of the way that human beings treat one another. Most of the time educational research involves people as sources of data. Whenever people are involved we need to take care to ensure that they do not undergo any significant harm. We can understand research ethics as a set of principles (e.g. "do no harm") or as a set of specific rules that can guide us in specific situations.

Some people thought that if they weren't doing research that could have an obvious impact on human well-being – such as medical or psychological research – then they were less exposed to ethical risks. There may be some truth in this, but the range of possibilities for harm are typically broader than this. We also have to think about privacy, data security, and the longer term implications of sharing research. This is why institutional ethical codes usually refer to experiments that involve human subjects in any capacity rather than just those taking part specifically in medical or psychological experiments. Even information about a person that might seem trivial or inconsequential can have ethical consequences.



*["A Moral Compass"](#) (CC BY-SA 2.0 Generic, [John LeMasney](#))*



## Institutional Research

Usually ethics is addressed in institutional research by adhering to the ethical guidelines set out by one of the advisory bodies that exists for almost every public entity that might be conducting research at some point (e.g. the guidance published by [BERA](#) or [NIH](#)). These bodies in turn are typically informed by medical ethics as expressed in the [Helsinki Declaration](#) (composed in 1964, partly as a response to the unethical research practices that surfaced in [the aftermath of World War II](#)). Institutional Review Boards – the term used to describe institutional research ethics approval committees in the USA – are a direct descendent of this declaration.

Central to most institutional research ethics are guidelines relating to all stages of the research process and what can and can't be done. There are institutional rules, but there are also various forms of guidance offered by research governance bodies.

The following table (adapted from Farrow, 2016) highlights the principles underlying the guidance offered by three major UK research governance bodies: the Economic and Social Research Council (ESRC); the British Educational Research Association (BERA); and the British Psychological Society. While the wording can vary, most of the advice given is quite consistent. This is because most research ethics guidelines can trace a common origin back to the aftermath of World War II.

Principle	ESRC (2015)	BERA (2014)	BPS (2010)
<i>Respect for participant autonomy</i>	Research participants should take part voluntarily, free from any coercion or undue influence, and their rights, dignity and (when possible) autonomy should be respected and appropriately protected. (ESRC, 2015, p. 4)	Individuals should be treated fairly, sensitively, with dignity, and within an ethic of respect and freedom from prejudice regardless of age, gender, sexuality, race, ethnicity, class, nationality, cultural identity, partnership status, faith, disability, political belief or any other significant difference. (BERA, 2011, §9)	Adherence to the concept of moral rights is an essential component of respect for the dignity of persons. Rights to privacy, self-determination, personal liberty and natural justice are of particular importance to psychologists, and they have a responsibility to protect and promote these rights in their research activities. (BPS, 2010 p. 8)
<i>Avoid harm / minimize risk</i>	Research should be worthwhile and provide value that outweighs any risk or harm. Researchers should aim to maximise the benefit of the research and minimise potential risk of harm to participants and researchers. All potential risk and harm should be mitigated by robust precautions. (ESRC, 2015, p. 4)	Researchers must recognize that participants may experience distress or discomfort in the research process and must take all necessary steps to reduce the sense of intrusion and to put them at their ease. They must desist immediately from any actions, ensuing from the research process, that cause emotional or other harm. (BERA, 2011, §20)	Harm to research participants must be avoided. Where risks arise as an unavoidable and integral element of the research, robust risk assessment and management protocols should be developed and complied with. Normally, the risk of harm must be no greater than that encountered in ordinary life, i.e. participants should not be exposed to risks greater than or additional to those to which they are exposed in their normal lifestyles. (BPS, 2010, p. 11)
<i>Full disclosure</i>	Research staff and participants should be given appropriate information about the purpose, methods and intended uses of the research, what their participation in the research entails and what risks and benefits, if any, are involved. (ESRC, 2015, p. 4)	Researchers who judge that the effect of the agreements they have made with participants, on confidentiality and anonymity, will allow the continuation of illegal behaviour, which has come to light in the course of the research, must carefully consider making disclosure to the appropriate authorities. (BERA, 2011, §29)	This Code expects all psychologists to seek to supply as full information as possible to those taking part in their research, recognising that if providing all of that information at the start of a person's participation may not be possible for methodological reasons [. . .] If a proposed research study involves deception, it should be designed in such a way that it protects the dignity and autonomy of the participants. (BPS, 2010, p. 24)

<b>Principle</b>	<b>ESRC (2015)</b>	<b>BERA (2014)</b>	<b>BPS (2010)</b>
<i>Privacy &amp; Data Security</i>	Individual research participant and group preferences regarding anonymity should be respected and participant requirements concerning the confidential nature of information and personal data should be respected. (ESRC, 2015, p. 4)	The confidential and anonymous treatment of participants' data is considered the norm for the conduct of research. [...] Researchers must comply with the legal requirements in relation to the storage and use of personal data as set down by the Data Protection Act (1998) and any subsequent similar acts. (BERA, 2011, §26)	All records of consent, including audio-recordings, should be stored in the same secure conditions as research data, with due regard to the confidentiality and anonymity protocols of the research which will often involve the storage of personal identity data in a location separate from the linked data. (BPS, 2010, p. 20)
<i>Integrity</i>	Research should be designed, reviewed and undertaken to ensure recognised standards of integrity are met, and quality and transparency are assured. (ESRC, 2015, p. 4)	Subject to any limitations imposed by agreements to protect confidentiality and anonymity, researchers must make their data and methods amenable to reasonable external scrutiny. The assessment of the quality of the evidence supporting any inferences is an especially important feature of any research and must be open to scrutiny. (BERA, 2011, §46)	Research should be designed, reviewed and conducted in a way that ensures its quality, integrity and contribution to the development of knowledge and understanding. Research that is judged within a research community to be poorly designed or conducted wastes resources and devalues the contribution of the participants. At worst it can lead to misleading information being promulgated and can have the potential to cause harm. (BPS, 2010, p. 9)
<i>Independence</i>	The independence of research should be clear, and any conflicts of interest or partiality should be explicit. (ESRC, 2015, p. 4)	The right of researchers independently to publish the findings of their research [is] linked to the obligation on researchers to ensure that their findings are placed in the public domain and within reasonable reach of educational practitioners and policy makers, parents, pupils and the wider public. (BERA, 2011, §40)	The ethics review process should be independent of the research itself [...] this principle highlights the need to avoid conflicts of interest between researchers and those reviewing the ethics protocol, and between reviewers and organisational governance structures. (BPS, 2010, p. 27)

Principle	ESRC (2015)	BERA (2014)	BPS (2010)
<i>Informed Consent</i>	Informed consent entails giving sufficient information about the research and ensuring that there is no explicit or implicit coercion . . . so that prospective participants can make an informed and free decision on their possible involvement [. . .] The consent forms should be signed off by the research participants to indicate consent. (ESRC, 2015, p. 4)	Researchers must take the steps necessary to ensure that all participants in the research understand the process in which they are to be engaged, including why their participation is necessary, how it will be used and how and to whom it will be reported. Social networking and other on-line activities, including their video-based environments, present challenges for consideration of consent issues and the participants must be clearly informed that their participation and interactions are being monitored and analysed for research. (BERA, 2011, §11)	The consent of participants in research, whatever their age or competence, should always be sought, by means appropriate to their age and competence level. For children under 16 years of age and for other persons where capacity to consent may be impaired the additional consent of parents or those with legal responsibility for the individual should normally also be sought. (BPS, 2010, p. 16)

Download a [PDF](#), [Word](#) or [RTF](#) version of the above table.

#### Activity 6A: Institutional Approval of Research (1 hour)

Find a copy of your own institutions ethical review procedure (sometimes called 'Institutional Review Board' or 'IRB'). You could then compare this with review procedures at other institutions, or just read it to see what strikes you as noteworthy. Here are some key questions to guide this activity:

- Are procedures more or less the same across institutions?
- What kinds of things seem to be the main concerns?
- How do institutional reviews try to assess the risk of a particular activity?
- What kind of strategies for managing risk are proposed/possible?
- Are there difference across institutions?
- Are there differences across subject areas / disciplines?



If you're not at an institution then you could find one that might apply to you in the future or one from an institution that is near to you.

If you can't find one then you can use the information provided by The Open University: [\*OU Ethics Principles for Research Involving Human Subjects\*](#).

It's somewhat rare to find a research institution that does not have a code of institutional ethics (at least in the Global North). But this is not to say that there is much diversity: most institutional research ethics codes are the same everywhere around the world, even where they aren't written down formally. This is partly because there's a shared family tree – all the different institutional codes express very similar principles.

One difference is legal compliance, which obviously varies according to country. Institutional review should ensure that any research carried out is legal, but it should also go beyond this, asking whether the work can be ethically justified. So, what's the difference? Many things are legal but arguably unethical, such as adultery, sharing private correspondence, failing to keep promises, jumping queues, and so on. Institutional review is intended to maintain the highest ethical standards, not just compliance with the law.

What happens when you're not affiliated to an institution that has an ethical review panel? You might be working with open data with no-one to supervise the project in this way. Does this entail that everything you do is ethical as long as it is legal? We'll consider this in more detail in the next section.

#### Activity 6B – Protecting Human Subject Research Participants (Optional, 3 Hours)

One common expectation made of researchers in the USA is that they will have completed the online training module 'Protecting Human Research Participants' provided by NIH Office of Extramural Research.

The training module is a great overview of research ethics and completion also enables you to produce a certificate of completion which is often needed for institutional ethics review.

You can find the training at <https://phrp.nihtraining.com>. It's free and takes about three hours to complete. Completion of this training module is required by many institutions in order to receive ethical approval to conduct research.

## Research in the Institution and Beyond

As an open researcher you will need to ensure that you have any required institutional permissions in place for the work that you want to carry out. Once these permissions are in place then the rules of the institution should be followed. They will normally define the kinds of behaviours that are acceptable. However, it should not be assumed that any behaviours not specifically mentioned (or forbidden) in institutional guidance are acceptable.

If working outside institutional processes (e.g. using Facebook or other social networks to connect with adult learners) you should take every precaution to make sure that your research adheres to the principles of ethical research. Generally speaking, it's not enough to simply get institutional ethical approval at the start of a project.

- Institutional approvals typically focus on protection of individuals rather than groups
- Research activities can change significantly over the course of a project
- Open projects can have many variables beyond the control of the researcher

It's important to continue to think about the ethical implications of research as a project evolves. Similarly, if you're doing research with informal learners (e.g. a survey of MOOC users) and no institutional approval is required you should still strive to consistently apply the same basic principles that underlie standard modern research ethics:

- Avoiding harm
- Ensuring that consent is informed
- Respecting privacy and persons

Next we'll think about how we might observe these principles if we are working completely outside of institutions and have no requirement to gain permissions for a research project.

### Activity 7: Ethical Implications of Openness (1 hour)

Consider the following text from Wikipedia on the definition of 'open research':  
Open research is research conducted in the spirit of free and open source software. Much like open source schemes that are built around a source code that is made public, the central theme of open research is to make clear accounts of the methodology freely available via the internet, along with any data or results extracted or derived from them. This permits a massively distributed collaboration, and one in which anyone may participate at any level of the project." ([Source](#))

Now consider the suggestions for an open research process available [here](#).

Do you think that there are potential ethical issues raised by the suggestions made for 'open research'? Would they be covered by the principles outlined in the previous activity? If not, are there new principles that we need to use when working 'in the open' (without institutional rules)? What might they be?

Networked, digital and open technologies present us with new possibilities for thought and action. It's become much easier to do make decisions that can affect a lot of people, as we saw in the Facebook example.

It is essential that the open researcher understands how to evaluate the ethical significance of their work. The simplest way to do this is to understand the principles of research ethics. We have suggested the following list of considerations:

- Respect for participant autonomy
- Avoid harm / minimize risk
- Full disclosure
- Privacy & data security
- Integrity
- Independence
- Informed consent

How ethical principles are applied is context sensitive, so it's important to keep reflecting on how these inform your work. An important element of ethical judgment is familiarity with ethical issues and how they are usually dealt with. Sharing your experiences with other researchers can be helpful. If you're working without formal support you will need to strike a balance between the exciting possibilities of 'guerilla research' and the need to exercise good ethical judgement throughout the research process.

Sometimes the impulse to be open can be in tension with our ethical expectations. One course participant raised the example of making research data available openly while protecting the right to privacy of participants. The more raw data is released, the greater the risk to privacy. But as more data is redacted the reuse value is reduced. Because the full implications of being open are often not known until the future, it's necessary to keep reflecting throughout the research process and into dissemination.

In essence, working outside institutions means that researchers must effectively function as their own review panel. It becomes even more important to engage in ethical reflection and develop a working knowledge of ethical risk management and strategies for amelioration.

Most of the rules concerning how research is conducted in institutions are based on several key assumptions. These include:

- The researcher has some degree of control over the research process, and thus has a responsibility for what happens – but can't necessarily anticipate every possible outcome
- There is an expectation that all reasonable efforts will be taken to minimise potential harm to participants
- The responsibilities of the researcher don't end with the study since there is an ongoing requirement to manage collected data at most institutions (typically a matter of legal compliance)
- There may also be rules regarding how the research is disseminated, who it can be shared with, and so on

Openness can make a difference across the entire research cycle:

- Building a research community through blogging and social media to generate and share ideas for research activities



- Using openly published papers to perform a literature review and context for a study
- Sharing proposed methodologies for peer comment (e.g. on a blog)
- Collaborating with other researchers to collect data
- Dissemination through open access publication; sharing data sets; publication under a Creative Commons licence
- Improving the visibility of work through repositories, search engine optimisation and sharing on social media
- Inviting quick and responsive feedback
- Using metrics to establish the impact of a piece of research



*["Citation Needed"](#) (CC BY 2.0 Generic, by [Dan4th Nicholas](#))*

When it comes to releasing research data openly it's important to reflect carefully. Both qualitative data (interviews, observations, etc.) and quantitative data (survey results, statistics, etc.) can be released in this way but arguably qualitative data might be less meaningful when considered outside of its original context. There's no

way to anticipate what might happen to data that is released openly because it can be used by anyone for whatever reason they see fit.

If you're planning on releasing data openly that should be made very clear in your consent forms so that people can know what they are agreeing to.

### 'Good' Open Research

Given that we can't always fully anticipate the specifics of future situations it's especially important for open researchers to be aware of future possibilities. There is a real need for using one's own judgment and reflecting on the ethical dimensions of research for oneself. When working in the open – potentially beyond institutional reach – an awareness of ethical principles and how they should be applied is essential.

We might say that thinking for oneself about ethics is characteristic of a 'good' open researcher.

#### Activity 8: What qualities does a 'good' open researcher have?

What other kind of qualities, skills or attributes might a 'good' open researcher have? Are they the same qualities that we would expect of a non-open researcher? What does 'good' open research look like? What might be the benefits? Either think it through yourself, research online, or discuss with friends or colleagues.

This was probably the exercise that learners on the moderated presentation of the course found hardest. It is possible to interpret the question of what makes a good open researcher in two different ways. A more abstract approach might involve identifying the characteristics and personal qualities of such people. There are several examples of where researchers have tried to identify these. For instance, Pring (2002) frames the virtues of educational researchers in terms of: positive interdependence; individual accountability; promoting success; trusting relationships. Toledo-Pereyra (2012) suggests the following qualities: interest, motivation, inquisitiveness, commitment, sacrifice, excelling, knowledge, recognition, scholarly approach, and integration.

It's noteworthy that openness can be seen as a distinct consideration in this way, even if one has no interest in openness as a specific concern. The need to have a

certain transparency about the research process and any findings is a long-standing scholarly virtue.

## Summary

So far we have looked at institutional processes governing research and ways in which the same principles might be applied outside of institutional requirements. We also considered the ethical implications of being open and the kinds of virtues we might expect open researchers to have.

It's not enough to simply know about good research methods: it's also important to practice them consistently.

The real point to take away from this part of the course is that open researchers need to be bound by the same ethical codes as traditional research. There is even a case for saying that open researchers need a stronger ethical code because they don't have the same support as institutional researchers. So it's crucial that as an open researcher you develop your own moral compass.

A tool that might be useful for this is [A Framework for the Ethics of Open Education](#). Both the principles of research ethics mentioned above as well as resources from philosophical ethics are combined in a tool designed to help people think more clearly about the ethical significance of their activities. (For the full paper including a discussion of the complexities that openness introduces into research, see [Farrow \(2016\)](#)).

*Download a [PDF](#), [Word](#) or [RTF](#) version of the framework.*

Another resource that might be useful is the [OER Research Hub Ethics Manual](#), which was written for an open research project team to facilitate reflection on ethical issues.

### Activity 9: Your values and ethical decision-making

Use the materials referred to in Section 2 to help you think about your own values and ethical decision-making processes. Do you act from judgement, or emotion? How do you account for the perspectives of others? Are your approaches to ethics consistent? Philosophical ethics can help us to arrive at answers to these questions.

Since every research project is different you may still have questions or things that you are unsure about. Whether you are based in an institution or not, it's important to keep thinking for yourself, making judgments about the ethics of research activity and the impact openness can have on research.

### *Further Reading*

- [OERRH Ethics Manual](#)
- [Introduction to Research Ethics](#)
- [Frequently asked questions about human research \(The Open University\)](#)
- [BERA Ethical guidelines for educational research](#)
- [Introduction to research ethics \(University of Leicester\)](#)
- [‘Ethics’, Internet Encyclopedia of Philosophy](#)
- Peter Singer’s MOOC on ‘Practical Ethics’
- [A short introduction to philosophical ethics for research](#)

## Open Dissemination

Dissemination is a widely used term, and one that you probably have a general interpretation of, but it is useful to consider a formal definition first. The European Union defines dissemination as:

the process of making the results and deliverables of a project available to the stakeholders and to a wider audience.” ([Source](#))

How can we make dissemination more in the open? In this chapter you will gain an understanding of:

- how open dissemination differs from traditional dissemination
- the role that technology plays in open dissemination
- some of the benefits and disadvantages of open dissemination
- Creative Commons licenses

## Open Access Publishing

One traditional aspect of dissemination that varies with open dissemination is the publication of research articles that may arise from a project. Over the past decade Open Access publishing has increased in uptake, with many research funders now mandating that any articles arising from their funding must be made openly available. Open Access is usually interpreted to mean “free online access to scholarly works”, although the [Budapest Open Access Initiative](#) (2012) gives a more formal definition, which encompasses not only free access in terms of cost, but also freedom from copyright constraints:

By ‘open access’ to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited. ([Source](#))

## Why Open Access?

Think about why we do research. Whether it is for public enrichment, scientific discovery, improving education or a country’s economy, “research can only advance by sharing the results, and the value of an investment in research is only maximized through wide use of its results.” ([Source](#)) Unrestricted access and unrestricted reuse of research results, including research data, are thus paramount to the advancement of our lives.

A project may decide from the outset that any publications will be published under an open access agreement, but this in turn may restrict the number of journals that can be considered. ‘[How Open Is it?](#)’, also available in a [number of other languages](#), is a guide to help you determine how open is a journal and make informed decisions on where to publish. If you would rather have someone else do the work for you, then search [The Directory of Open Access Journals](#).

Publishing open access may also have implications for the budget; many publishers charge Article Processing Charges (APC) to offset costs incurred in peer review management, journal production, online hosting and archiving, etc.

### Activity 10: Advantages and Challenges of Publishing Open Access (20 minutes)

In your opinion, what are the advantages and disadvantages of publishing research and data openly?

[SPARC Europe write about the benefits and challenges of open access](#), which we reproduce here:

#### Benefits

Different stakeholders in the system of scholarly communications can and will benefit from no restricted access to research and data:

- Researchers as authors: immediate visibility for research output and thus increased visibility and usage of their results. Open Access may even lead to an increase of impact
- Researchers looking for information: access to literature everywhere, not only from a campus but also from any site with wifi access
- Funding agencies: increased return on investment (ROI), increased visibility
- Universities & research institutes: greater visibility, clearer management information
- Libraries: increased access for target audience, financially a more attractive model than the current subscription model
- Teachers & students: unrestricted access to material, enriched education, allowing equality of learning in poor as well as in rich nations
- Science: enhanced and accelerated research cycle

- Citizens & society: access to knowledge / access to the results of publicly funded research
- Enterprises: access to critical information
- Publishers: transparent business model, ultimate online article distribution, ultimate visibility for articles

## Challenges

- The need for researchers to maximise the dissemination and impact of their research
- The need for readers to have access to the full corpus of relevant research literature
- The possibility of creating a continuum of integrated scholarly information, from raw data to peer-reviewed publications
- The development of open access models
- The emerging technical standards to facilitate open archiving
- The need for organisational structures to ensure access to digital archives
- The complexities of intellectual property rights and copyright issues
- Restrictive license conditions
- The disproportionate levels of library budgets spent on journal subscriptions, particularly in the science, technical, and medical (STM) areas
- The concentration of a significant part of scholarly output in the hands of a small but highly influential number of commercial publishers
- A widespread reluctance to cancel print until electronic archiving arrangements are secure

## Impacts of Open Dissemination

Having looked at open access publishing in particular, we will now consider open dissemination more broadly. In the case of the OER Research Hub, our research has been supported and facilitated by 'open' dissemination. This open dissemination approach was an integral part of the initial project bid and has helped us meet and deliver our project goals.

In the context of OER Hub the researchers:

- Created a project identity on various tools including [Twitter](#), [Scoop.It](#), [YouTube](#) and [Slideshare](#)
- Made the project blog the core part of our project identity
- Shared our research progress, outputs and methods on a regular basis, via our website/blogs and other media
- Created and used our [OER Impact Map](#) to encourage contribution and feedback from the rest of the OER community
- Shared our data openly, including survey results
- Shared our methodology and research instruments under a CC-BY licence

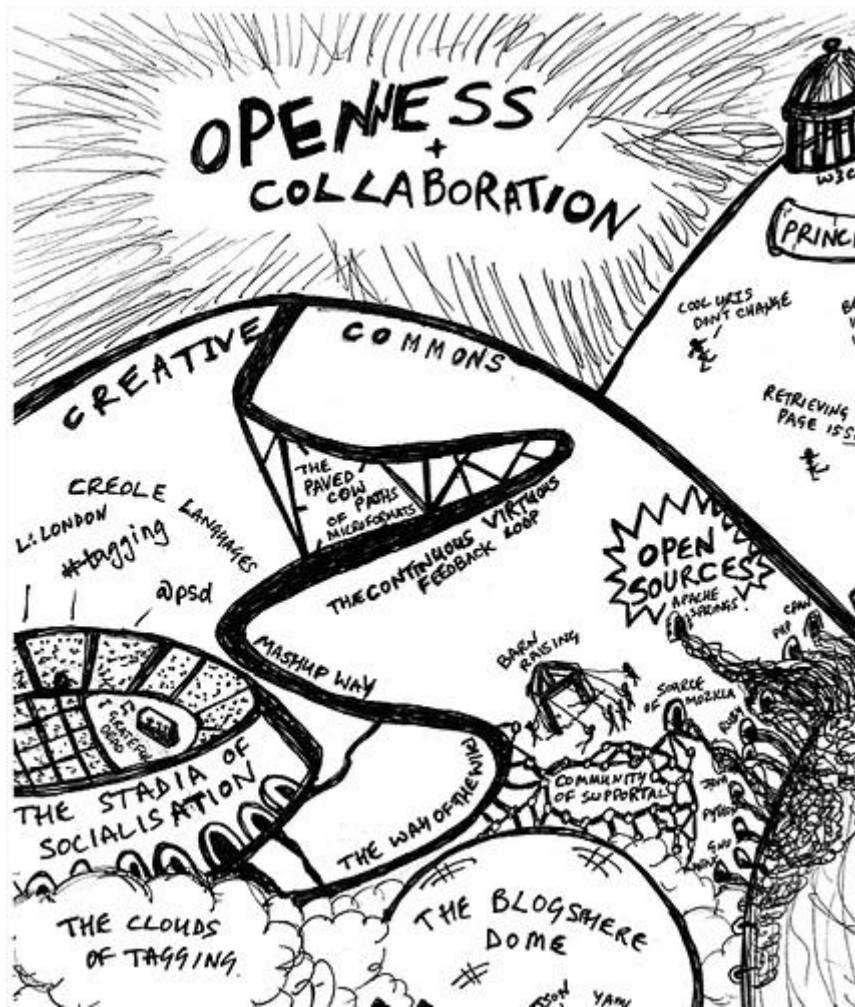
But it is not always about choice. As we mentioned earlier, many funders now make it compulsory that research outcomes are openly archived. For example, the Research Data Policy of the Economic and Social Research Council (ESRC) in the UK stipulates that "[All data created or repurposed during the lifetime of an ESRC grant must be made available for re-use or archiving within three months of the end of the grant.](#)" The USA government announced in 2013 that the results of federally funded research should be made freely available to the public generally within one year of publication. ([REF](#))

Can this be detrimental to the impact of your research? Niyazov et al. (2016) argue that in fact [publishing open access improves the number of citations](#).



### Activity 11: Can Open Dissemination make a difference? (15 minutes)

Consider the example of the [OER Hub](#) or any other project that you are familiar with. How do you think disseminating in the open in such a manner may benefit/hinder a research project?



*"Openness and Collaboration" (CC BY 2.0 Generic,  
Paul Downey via Wikimedia Commons)*

Here are some of the benefits of open dissemination highlighted by participants in the facilitated version of the course:

- “Working in the open potentially ensures more careful outputs”
- “... the possibility of building live, collaborative networks even after the initial research has been scoped and planned”
- “... the ability to connect with key stakeholders who are likely to be interested and impacted, and who may feel involved and invested to become part of the project”
- “Increased public engagement” as “research is made relevant and accessible to the public and society”

The latter, however, can also be considered a limitation:

- “An open approach to research (...) may invite many distracting requests and queries. I’ve seen this happen in a project where there was so much interest to deal with that the museum had to formalise and somewhat restrict what had been an open door policy to their research project”

## Facilitating Open Dissemination

With the advent of technology and the growing influence of social media communities, we now have a wider interpretation of ‘openness’. The concept of sharing outputs is no longer just viewed in a formal sense (e.g. a journal publication), but outputs can include informal ideas, suggestions and presentations.

Here are some examples of how technology has been supporting openness to a wider community:

1. [Stephen Downes](#) curates blogs on a wide range of topics relating to educational technology, and publishes a daily and weekly digest.
2. [True Stories of Open Sharing](#) is compiled by Alan Levine and “...shares moving, personal stories that would not have been previously possible, enabled by open licensed materials and personal networks.”
3. [Ten things you need to know about ORCID right now](#) highlights the importance of having a permanent identifier for researchers.

### Activity 12: Tools that support Open Dissemination (30 minutes)

Think about some technologies that support and facilitate open dissemination (e.g. Facebook, Twitter, blogging platforms, Flickr, SlideShare, Scoop.it, etc.). Select which of these tools you would use to disseminate your research and reflect on why.

In selecting a channel, think about your project's audience and what they could easily gain access to. For example, does your community have ready access to internet? Is your community active on a particular social network? Does your community regularly engage with blogs?

Here are some thoughts and ideas for tools to disseminate research from previous course participants:

- "It depends heavily on what you're doing. From where I'm sitting, [Flickr](#) would be entirely inappropriate, mostly because my audience isn't there, but partially because Flickr isn't set up for science. [Figshare](#) is pretty awesome, partially because you do get a DOI for your work, which makes it citable, and [DataDryad](#) is becoming more popular. [SlideShare](#) seems to be the location of choice for presentations, though some people host their own. (...) You'd want to make sure your location of choice supports the metadata that your field expects (or would like to see) to ensure your information actually can be viewed, read, and reused."
- "My next project could be based on a guerilla research approach, and I would use blogging as the main media/genre (with [WordPress](#) as the platform) for dissemination during the research process, as blogging gives the possibility to present coherent thought of some length with the room for commenting and having people follow. At the same time blogging is a way of disseminating that is well accepted in the communities that could be interested in the project and that I could be interested in dialogue with. (...) And then as a media/genre, a blog gives the possibility to embed videos, [SlideShares](#), [Tweets](#) and link to other kinds of social media, and thus a blog can be a kind of repository for the different outputs of a project. To spread the news, Twitter is a must. And if it does end up with an article, an open repository would be an option."
- "Some of my research project's audience has access to the internet so would follow the blog, look at photos on [Flickr](#) and a few may use [Twitter](#). Others

use [Facebook](#) where the project has a presence, so my online dissemination strategy for research is usually to write a blog post about it explaining the latest activities and findings then tweet the post and share it on Facebook. If there are any related images these are posted within the blog post or on Flickr. Raw data in spreadsheet format will soon be shared online via [Google spreadsheet](#), inviting those who are interested in participating in the research activity to contribute as well."

## Open Licencing

For dissemination to be considered as 'open', reuse of a project's outputs, be it data, presentations, video or articles, would be explicitly encouraged. One way of retaining ownership of the copyright for your content while showing other people that it is "open" and can be reused in specific ways is to openly license them. One popular range of open licences is provided by [Creative Commons](#) (CC).

The following image explains what each of the licences allow you to do:



[How to Attribute Creative Commons Photos](#), by FOTER, [CC BY-SA 3.0](#)

These licences can be combined. For example, the image reproduced right above this paragraph has been released under a CC BY-SA licence, which means that it can be reused as long as it is attributed and shared under the same terms. The resource creator has not added any restrictions with regard to adapting the resource (note that we have cropped it from [the original](#)) or using it for commercial purposes.

The same applies to research outputs. For example, the survey data that OER Research Hub collected is available on [Figshare](#) under a CC BY license: this means that anyone can access the data file, download it, add more data to it, carry out a

different analysis, etc. as long as OER Research Hub are cited as the original provider of the data.

You can also read more about how to license different types of research outputs (for example data or databases) in the guidelines available via the [Creative Commons wiki](#).

Activity 13: Choosing the most appropriate Creative Commons license for your needs (30 minutes)

Read Claire Redhead's blogpost [Why CC-BY?](#) and reflect on which CC license you would choose to release your research outputs.



*Graffiti Wall at OKFest14, Berlin ([CC BY 4.0 International](#), [Beck Pitt](#))*

As Clare Redhead notes there are a number of arguments for and against using more or less restrictive Creative Commons licenses. Here are some of the reasons previous course participants gave for their use of specific Creative Commons licenses:

- “Context is everything: I work with data and methods and science, and I get paid with grant money. My motivations in publishing openly are to ensure other researchers and data enthusiasts can read and use my stuff, so my concerns are very different from, say, an artist's concerns. If someone does something cool with my data and cites me, that's a good thing. If someone

takes an artist's awesome image and sells it on journal covers without telling anyone, that's not okay. (...) Because reputation is important in research, my answer is kind of based on the zeitgeist in the field. I'd tend towards the least restrictive license I can get away with given institutional and publication guidelines, and it looks like it's possible in many cases to go straight for CC-BY."

- "Well, I'm still researching this and considering options. I've seen a couple of artists who also make moving image who have some clips on their website which are protected and some which are freely available to download and use under a creative commons license. (...) I think that in my own work I am still confused about what might be research which could be openly available to others, and what is my core work and creative capital. There are so many overlapping layers and edges. And since research is not my core activity, but part of my art practice, there are additional formatting and time issues which need to be considered. However, open research is surely about establishing conversations about ideas, and that's a good place to start from."

## Planning for Dissemination

To end this section of the course we would like you to think about your own research interests and plan your own mini-research project. This activity should bring together all of the ideas we have discussed so far.

### Activity 14: Mini-Research Project (45 minutes)

Think of all the different things you would need to consider when planning a research project (you can look back at Chapter One if you need a reminder). In what ways could you incorporate open research practices (such as sharing your data or being open about your progress) into your research project?

Download the *Planning your own Research Project* pro forma ([PDF](#), [Word](#), [RTF](#)) and use it to help organise your thoughts. In what ways (if any) could openness make a difference to your research process?

### Further Reading

- Martin Weller, [\*The openness-creativity cycle in education: a perspective\*](#)
- Martin Weller, [\*The Virtues of Blogging as Scholarly Activity\*](#)
- David Wiley and Cable Green, [\*Why Openness in Education?\*](#)
- The Open University's OpenLearn Course on [Open Education](#)

## Reflecting in the Open

You have had a chance to understand what it means to do open research, what are some of the ethical issues that may arise from doing research in the open, and to discuss the benefits and shortcomings of public dissemination. In this chapter we invite you to reflect on your own experience of being an open researcher.

1. Why open researchers reflect in the open
2. When to reflect and who is involved in open reflection
3. Some tools to help open reflection

### Researchers Reflect on Reflection

You may not realize it, but the act of reflecting is a constant activity, which for the most part remains elusive. We go through our day thinking about what's been happening, how we feel about it, how we react to events and what are the next steps to take. In research, we tend to record these thoughts as a way of evaluating our progress.

In three short audio podcasts some researchers talk about their take on reflection in research and how reflection can happen openly. You can access these via <https://pressbooks.pub/openresearch/chapter/section-four-reflecting-in-the-open/>.

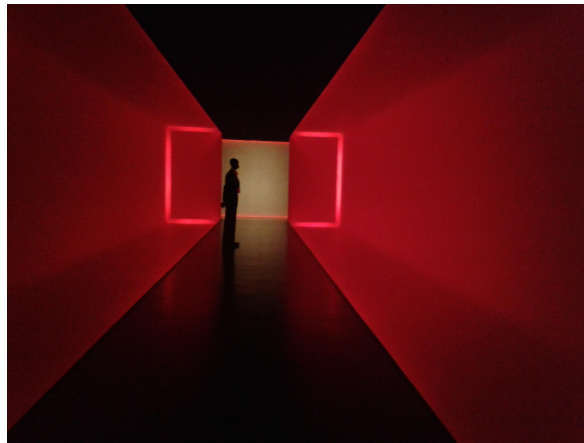
You can find transcripts of all the audio in the [Appendix](#).

[Leigh-Anne Perryman](#) (Academic Staff Tutor and OER Research Hub Open Fellow) on the role of reflection in research.



[Tita Beaven](#) (Head of Department and Senior Lecturer, The Open University) on the role of reflection in research.

[Tita Beaven](#) (Head of Department and Senior Lecturer, The Open University) on conducting research in the open.



*Turrell's The Light Inside at The Museum of Fine Arts, Houston ([CC BY 4.0 International](#), [Beck Pitt](#))*

## Blogging and Reflection

Reflection in research is closely linked to evaluation: it is about making sense of what we have done, what we are doing and how we are going to evolve. What do we gain or lose when we share this evaluation publicly? Why reflect in the open?

### Activity 16: Catherine and Megan (45 minutes)

We invite you to read two blog posts: in [the first one](#), Catherine Cronin, a lecturer in Information Technology at the National University of Ireland, Galway, reflects on her topic of research: digital identity practices in open education. [The second blog post](#) is a reflection by Megan Beckett, Project Manager at Siyavula, on her experiences of sharing.

Read both blog posts and think about the following questions:

- Why do Catherine and Megan blog?
- Do you think they achieve what they set out to do?
- Would you be comfortable sharing as they do? If not, why not?





*The other is about seeking a platform to share ideas and thoughts from and trying out a voice to go public with in a much more essayistic mode of writing on the process of becoming a scholarly blogger. (And by the way I'm a fan of 'Brain Pickings', too.)*

*The two blogposts are both very good reads with interesting content and lots of links. I have been using both modes of blogging – the content centered and the more essayistic – but I am most comfortable with the first. It has to do with the fact, that online sharing is like broadcasting, and as the internet takes your words anywhere, they might also be misunderstood or misused, so I prefer not to expose my private thoughts too much. They might come back to me like a boomerang in a way I wouldn't like. The danger of someone stealing my ideas is less of a concern for me, as the blog is licenced (...) and I think that blogs and ideas are more expected to be attributed in research communities today (- and that being said while I know some might think this is a naive point of view!).*

*Megan's purpose in blogging appears to be to develop her own research skills while also contributing to the development of a shared scientific community that shares openly and through doing so co-develop their skills and research competences. Catherine's way of using her blog seems to be part reflexive-practitioner, part as a means to share her initial thinking about her current research which allows for the possibility of feedback from interested scholars. Both of them are engaging in a form of open research by discussing their roles or methodologies as researchers and inviting commentary and critique.*

*I'm not sure if I would be that comfortable sharing as they do just yet, as I still feel I need more experience and knowledge as a researcher to build up my own competence. Nevertheless, I applaud the effort!"*

## Reflection and Evaluation

Who is involved in reflection in the context of evaluating an open project? Do we have to reflect in isolation? Can reflection also be collaboration? Is the value of reflection only important at the end of a project? How important is it to reflect in a structured manner?

Watch [Leigh-Anne Perryman](#), OER Research Hub fellow and author of the [OER Research Hub project's Evaluation Framework](#) answering these questions. Do you agree with her?

*These videos are subtitled and you can also find transcripts of the audio in the [Appendix](#).*

## Tools for Reflection

Blogging is probably one of the easiest platforms to share your thoughts publicly, but reflecting doesn't necessarily mean having to write a long piece. You can record a video or audio podcast, publish a series of tweets, draw some pictures, keep a photo journal, etc. What follows are examples of open reflection in different formats.

- Chrissi Nerantzi uses a [visual diary](#) to help her rework the Literature Review section of her PhD
- Diana Samson uses Storify to collect tweets in [MOOC MOOC Learning Reflections](#)
- Susan Spellman Cann videos her reflections in [Becoming an open educator](#)
- Wells for Zoë, a small humanitarian organization in Malawi, keep a [Photo journal](#)
- Beck Pitt sketch notes [Catherine Cronin's plenary at OER16](#)
- Matt Might uses pictures to describe what a PhD is in [The Illustrated Guide to a PhD](#)

## Reflecting on your own research

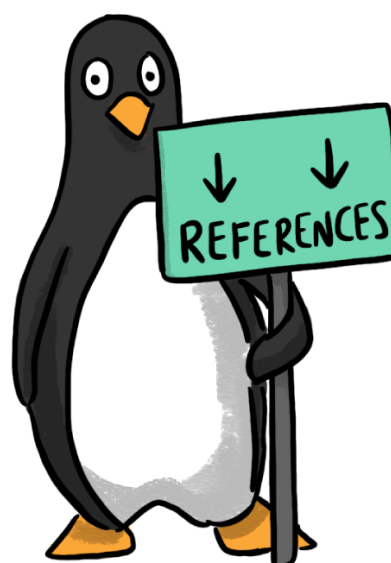
In this last section we invite you to reflect about how open you have been when conducting research in the past, how open you are now and how open you can be in the future. If you'd like, be creative about the tool you use and about who you do your reflection with.

Here are some questions to help your reflection:

- How open were you when conducting research before you started working through these materials?
- What parts of your research, if any, did you share openly?
- What do you think works well for you about doing open research?
- What do you think might not work so well for you?
- What are you going to do to be a (more) open researcher in the future?
- How are you going to change your practice?

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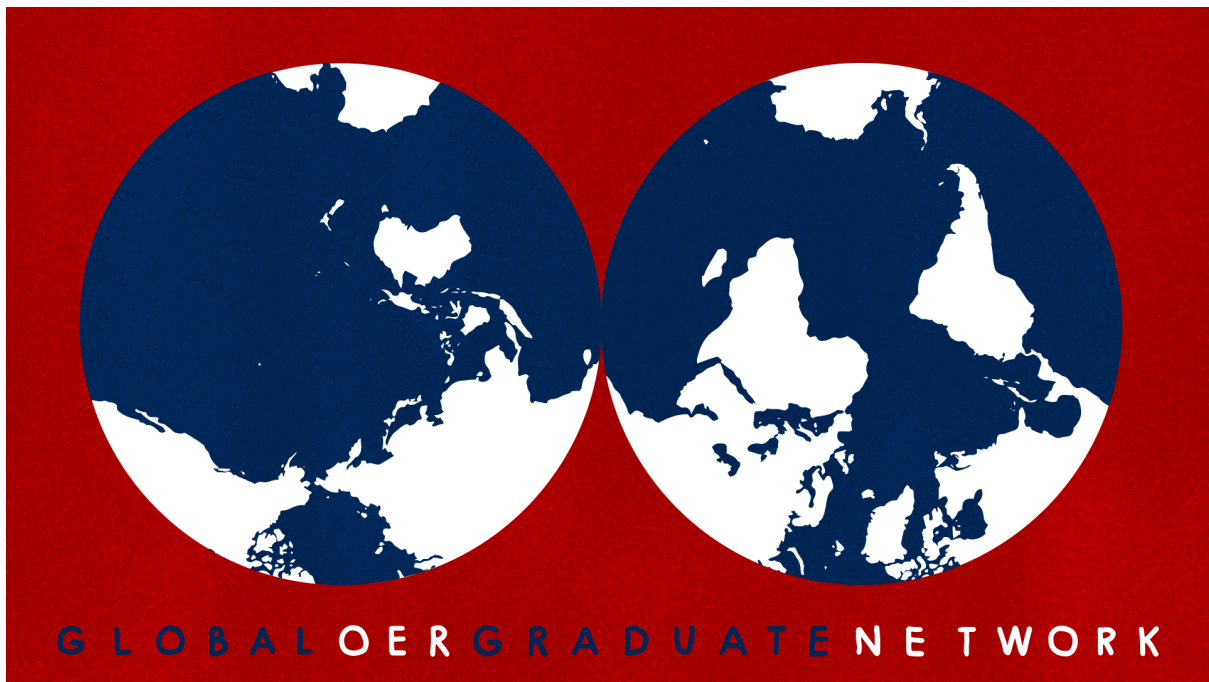


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