IDOCOS

Innovative Doctoral Courses for Sustainability

Handbook for co-creation and sharing of doctoral courses, version 2

in an online and blended context

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Please address all queries to handbook@idocos.eu

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Acronyms

ACODE:	The Australasian Council on Open, Distance and e-Learning
AI:	Artificial Intelligence
BCG:	Boston Consulting Group
CCCOER:	Community College Consortium for Open Educational Resources
COIL:	Collaborative Online International Learning
DCU:	Dublin City University
DELT:	Digitally Enhanced Learning and Teaching
DT:	Digital Transformation
ECTS:	European Credit Transfer and Accumulation System
EUA:	European University Association
IAU:	International Association of Universities
IDOCOS:	Innovative Doctoral Courses for Sustainability
IQOER:	Instrument for Quality Assurance of OER
LMS:	Learning Management System
NorDoc:	Nordic Doctoral Training in Health Sciences
NORSI:	Nordic Research School in Innovation and Entrepreneurship
OA:	Open Access
OCDE:	The Organisation for Economic Co-operation and Development
ODE:	Open, Distance and Digital Education
OER:	Open Education Resources
OPM:	Online Program Manager
PEBL:	The Partnership for Enhanced and Blended Learning
SEA-EU:	European Universities of the Seas
SPARC:	Scholarly Publishing and Academic Resources Coalition
SWOT:	Strengths, Weaknesses, Opportunities and Threats
TELAS:	Technology Enhanced Learning Accreditation Standards
UOC:	Universitat Oberta de Catalunya
VE:	Virtual Exchange

CHAPTER ONE

1.1. Introduction

This handbook is dedicated to our dear friend and esteemed colleague Professor Love Ekenberg, who passed away in September 2022 while taking part in the project. We mourn his untimely death, and lament he is not with us to see the end results.

The handbook, or guide, presents essential questions for guidance in the process of co-creation and sharing courses, yet it does not aspire to have complete solutions to all questions. Through awareness raising from the questions posed combined with the examples presented in this handbook, the process of co-creation and sharing can be made more transparent and directed towards realistic goals. Consequently, this understanding should stimulate and guide communication within the groups of people working together through the process. Mistakes could occur when we do not make use of what we know or communicate about what we know. Thus, we hope this handbook will help set a clear and meaningful context and minimise mistakes that could arise from missing components of knowledge in the process of co-creation and sharing courses. A checklist including basic questions for communication and decisions that can be used step by step in the co-creation and sharing process is provided at the end of this handbook.

The handbook presents concrete technologies and applications. These are, to some extent, time and context dependent. For example, by the time this handbook is published (May 2023), there is high attention on the development of AI applications based on ChatGPT-4. ChatGPT is the fastest growing application ever with more than 100 million users in a very short time. Spend some time identifying and preparing how to use new applications launched within the education marketplace, either the open licensed ones – recommend by us – or proprietary. In particular, be attentive to AI-based applications.

Awareness and respect for culture and language issues are important in the co-creation and sharing of courses. This handbook targets the European Higher Education Area in particular but can be used globally. When considering other areas, for example, Sub-Saharan Africa, the guidelines need to be adapted to specific contexts, and could be easily modified since it is an Open Education Resource. In doctoral education, English is considered the lingua franca for international cooperation. It is therefore imperative to highlight that, if co-creation occurs at bachelor level courses, the issue of courses taught in local languages becomes significant.

The handbook has been co-created within the IDOCOS project, with funding from Erasmus+. **I**nnovative **D**octoral **C**ourses for **S**ustainability indicates that this consortium believes international cooperation on doctoral education can have a significant impact on facing the world's most burning issue: Sustainable Development. The main motivators for IDOCOS and this handbook include initiatives for co-created courses and research on topics such as the Green Deal, Climate Change and Energy, to mention a few, combined with building capacity on Digital Transformation and how an inclusive digital transformation could contribute to better meet the Sustainable Development Goals (SDGs). The handbook may also be used within or outside the sustainability framework. As an open licensed resource, the content may be copied, changed, and adapted, providing ownership of the handbook.

1.2. Aims and scope

1.2.1. Why this handbook?

The scope of this handbook is to support the co-creation and sharing of doctoral courses in an online and blended context across universities, and across countries. Cooperation on courses (and programs) has been on the internationalization agenda of universities for many years. What is new and may partially justify this work, are some very significant trends that have become increasingly visible:

- Digital transformation of learning and teaching had been growing slowly at universities, and has been accelerated through the Covid-19 Pandemic (Figure 1, EDUCAUSE, 2021).
- Increase in international comprehensive university networks, e.g. the European University Alliances – where courses are often a key component in collaborations (Figure 2, European Commission, 2022).
- A new trend penetrating higher education, in particular the US and Oceania, but in Europe, known as 'platforming' is increasing (Figure 3, Holon IQ, 2022). In platforming, Online Program Managers, OPM, are a critical phenomenon.
- Virtual exchange (VE) in different formats has been mushrooming, pushed by the pandemic and the EU. The Erasmus+ Virtual Exchange (EVE – 2018 – 2020) program led by the European Commission, strongly recommends the promotion of virtual exchange throughout the European Education Area. Similarly, a specific form of VE Collaborative Online International Learning, COIL, has become more widespread worldwide (see Figure 4).
- Our own experiences in developing partnerships between universities in the global north and the south, put issues on our agenda. Nowadays, in light of recent concern relating to de-colonisation, rethinking is necessary for collaborative courses and programmes.

1.2.2. Universities are entering digital transformation

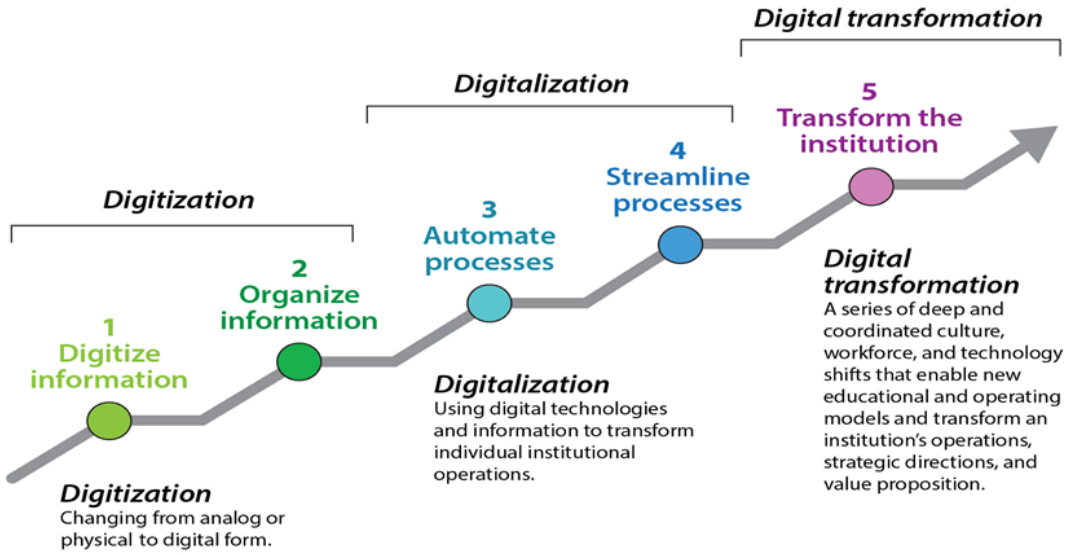

Figure 1: Process from digitization, digitalization to digital transformation – process universities are much more familiar with today. This illustration has been retrieved from EDUCAUSE Defining Digital Transformation in Higher Education EDUCAUSE – Digital transformation

1.2.3. New and comprehensive university partnerships are entering the scene

Since 2019, under the Erasmus+ and Horizon umbrella, 44 European Universities alliances have been created, involving around 340 higher education institutions. These alliances are testing diverse models of the concept of European Universities and are examining its potential to transform higher education. The European Universities Initiative is being fully rolled out and scaled up under the Erasmus+ programme 2021-2027.

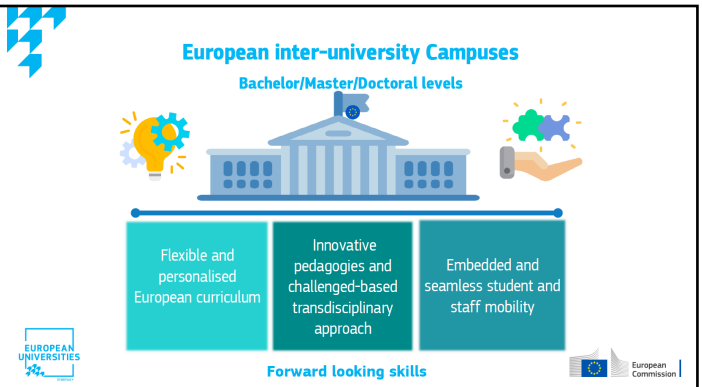

Figure 2: The core of the European Universities initiative is to create European inter-university Campuses with shared education at all levels. The figure is from a European Commission presentation of the European Universities Initiative 2022

1.2.4. Platforming is creating a new global situation for higher education

An Online Program Management Partnerships (OPM) agreement is defined as the outsourcing of a suite of services that lead the external provider to participate in the managing of the online program (Cheslock et al, 2021).

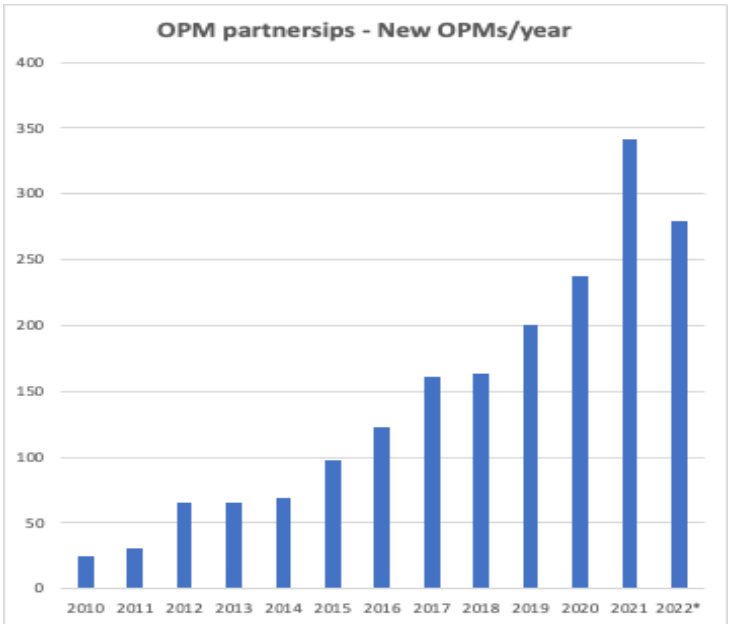

Figure 3: Explosion of Online Program Management Partnerships and data from HolonIQ *2022=estimate Online Program Partnerships – OPMs, HolonIQ 2022

1.2.5. Virtual Exchange is strongly promoted throughout the European Higher Education Area

Virtual Exchange (VE) can be seen as an umbrella term for the many ways students engage in online collaborative learning with partners from other cultures as part of their educational programmes.

The Erasmus+ Virtual Exchange project defined VE as a technology-enabled people-to-people educational programming facilitated and sustained over a period of time.

Figure 4: Illustration of Virtual Exchange – The facilitator community and Erasmus+ Virtual Exchange Activities are from the Erasmus+ Virtual Exchange (EVE – 2018 – 2020)

1.2.6. Simple, affordable and linking to other sources

In a relatively short and straightforward way, this handbook takes the users through the whole process of co-creation and sharing up to the final implementation and sustaining of a collaboration. It does not, however, intend to guide on, e.g. online and blended learning and teaching, as there are many excellent guides available for this. The aim is to invite readers to reflect through the whole process so that possible decisions and actions are achieved. For those who wish for more depth, the handbook includes references and links where subjects can be scrutinized according to interest.

The handbook aspires simple and affordable solutions for co-creating and sharing courses in an online and blended context. Since each university has its approach to sharing courses, we intend to make co-creation and sharing realistic and achievable for all, including within a north–south context. For example, the handbook's demonstrator course, Digital transformation, has a basic approach for facilitating online learning and teaching in low-bandwidth conditions. In the same way, the demonstrator platform for collaboration and digitally supported co-creation and learning has a simple solution that any higher education institution should be able to integrate into their own context.

1.2.7. Potential users and a checklist

The handbook has been created for academics, professors, lecturers, PhD candidates, librarians, technicians and management, such as programme directors already involved in or considering designing collaborative courses across countries.

A checklist (see Appendix I) summarises the considerations that should be made, taking the reader's ideas on co-creation and sharing into account.

1.3. The focus of the handbook

The handbook focuses on the co-creation and sharing of doctoral courses between universities in different countries within a region, e.g. Europe, but can also be applied between regions or globally (see Figure 5 below).

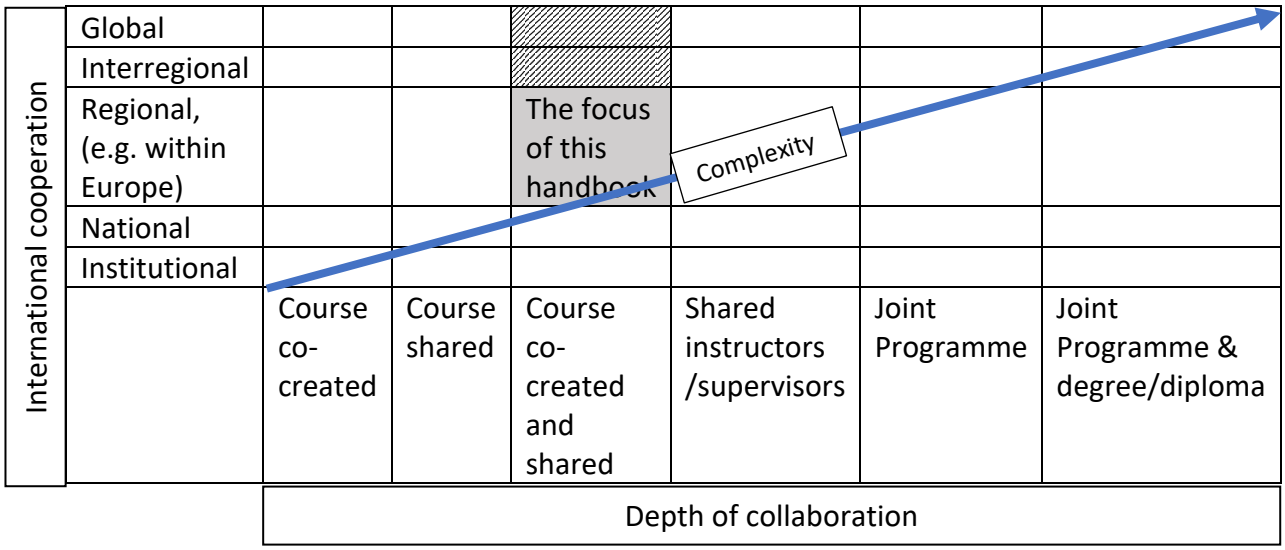

Figure 5: The focus of the IDOCOS handbook

A third dimension could be added to international cooperation and depth of collaboration: type of course. Within doctoral education, courses can typically vary from quite a standardized course, e.g. scientific writing, and scientific frontline courses, to research-driven courses with little existing course material. While the first type of courses would be easier to co-create and share, the latter ones would be more complex.

There are several reasons why the primary focus of this handbook is on courses. First and foremost, there are potentially huge benefits to harvest from co-creation and sharing of courses, please see the findings under the section "Why co-create and share internationally?". Furthermore, collaboration on courses is a widespread and popular activity among higher education institutions. In addition, limiting the collaborative scope to courses simplifies the collaboration instead of a more ambitious and in-depth collaboration such as a joint degree. Even though doctoral level education may be more attractive for both co-creation and sharing, bachelor or master's level is also well suited for co-creation and sharing.

Co-creation and sharing can be developed as an attractive form for virtual exchange. However, this exercise will require adapting the specific goals for VE, ref. Erasmus+ Virtual Exchange. A new action with focus on mobility should also be taken into consideration, the Blended Intensive Programme (BIP), which aims "to contribute to establishing a European Education Area with a global outreach and to strengthen the link between education and research. These are short, intensive programmes that use innovative ways of learning and teaching, including the use of online cooperation."

This handbook selected doctoral level courses as the point of departure because the PhD level offers more flexibility in the course structure and, for most countries, the course element is increasingly important in PhD education. The survey Doctoral education in Europe today: approaches and institutional structures (EUA, 2019) found that doctoral programmes and schools are by far the dominant form of organisation in Europe, see the Figure 6 below.

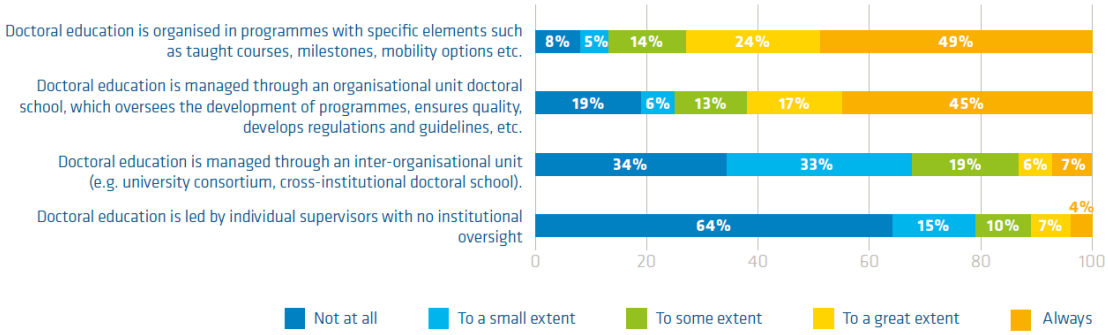

Figure 6: Organisation of doctoral education in Europe, (EUA, 2029).

The survey Doctoral education in Europe: current developments and trends (EUA, 2022) presented an overview of mandatory, optional and required skills training. Figure 7 below illustrates the mandatory skills training.

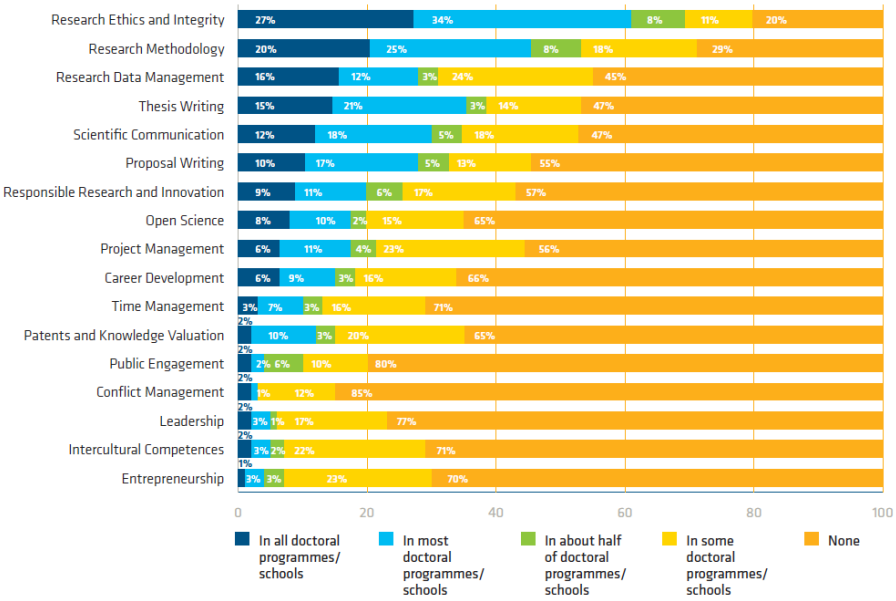

Figure 7: Mandatory transversal skills training - What type of mandatory transversal skills training is offered to doctoral candidates at your institution? (EUA, 2022).

Standalone courses are becoming increasingly more popular, for example to strengthen labour market attractiveness for PhD candidates and others, ref. also microcredentials. For those with a higher ambition, for instance shared doctoral programmes and joint/double/multiple doctoral degrees, such initiatives are regarded as quite more complex. Please ref. to Figure 5.

For joint programmes, several guides are available, such as the Joint Programmes from A to Z, A reference guide for practitioners, and the second, updated edition (Becker, 2020), which is recommended reading. See in particular Chapter 14 Joint doctoral programmes – page 77–81. National guides may also exist, such as the Swedish (2013) and the Norwegian (2015) ones may also exist. EUA offers advice on cooperation with individual doctoral candidates in its report Co-tutelles in European universities: concept, aims and implementation (2022).

To co-create and share courses only is considered less complex and less time-consuming from a legal and management perspective. However, the guides mentioned above also give valuable input to the

sharing of courses, in particular when aiming for mutual recognition between partnering universities and countries, e.g. by credits.

1.4. Definitions and concepts

1.4.1. Course and credits

An academic course in this context is a formally organized unit recognized by an educational institution for meeting an educational requirement that has a credit value. A course can be a part of a programme – or stand-alone. Micro-credentials certify the learning outcomes of short-term learning experiences, for example, a short course or training. This handbook uses the European Credit Transfer and Accumulation System, ECTS, in which an academic year has 60 ECTS.

1.4.2. Sharing courses

Course sharing will involve giving students from other universities the opportunity to register and take a course or courses from another university with the possibility of transferring credits awarded to their universities. Course sharing should be used to boost efficiency, expand access for students and leverage the strengths of each university. For example, courses with fewer student enrolments could be opened for students from other universities to enrol and vice-versa. By using a blended learning approach, these courses could be taken by both domestic and international students so that each institution could concentrate on the areas in which they have a comparative advantage. However, the sharing of courses should be done with cognisance to the rules and regulations governing the processes of taking courses and awarding credits to each institution.

1.4.3. Co-creation of doctoral courses

Co-creation is understood as cooperation emphasising an interactive creative process, and the partner universities are considered equal for the collaboration. It is a partnership between academics at universities in at least two countries to create one or more doctoral courses. Co-creation in this context may or may not include doctoral candidates.

Sharing in the context of co-creation and sharing of doctoral courses means that the partner universities share the outcome of the co-creation process.

1.4.4. Digital transformation

Digital transformation has been investigated from different perspectives, for example, Gong and Tibiere (2021 p.12) define it as

> *“a fundamental change process enabled by digital technologies that aim to bring radical improvement and innovation to an entity [e.g., an organization, a business network, an industry, or society] to create value for its stakeholders by strategically leveraging its key resources and capabilities.”*

Davenport and Redman (2020) add that

> *“Digital transformation requires talent. Assembling the right team of people in four domains — technology, data, process people, and organizational change capacity — may be the single most important step that a company contemplating digital transformation can take. Each of these areas requires a certain set of skills.”*

Among the various definitions of digital transformation in higher education, for this handbook, the authors draw from the definition given by Brooks and McCormack (2020)

> *"a series of deep and coordinated culture, workforce, and technology shifts that enable new educational and operating models and transform an institution's operations, strategic directions, and value proposition."*

1.5. Why co-create and share internationally?

In the autumn of 2021, European universities were asked "What are the main advantages and incentives for international co-created and shared doctoral courses"; the findings are presented below.

Table 1: The main advantages and incentives for international co-created and shared doctoral courses (highest values in **bold**)

	Very important	Important	Somewhat important	Not important
Enhance quality in education and research	**77%**	19%	4%	0%
Share and gain access to expertise	**64%**	33%	4%	0%
Contribute to professional development through engagement with peers internationally	**61%**	27%	12%	0%
Explore new influences, opportunities and discourses	**59%**	30%	10%	1%
Contribute to international capacity building	**59%**	28%	12%	1%
Career development	**54%**	27%	18%	1%
Increase the outreach to doctoral candidates	**53%**	37%	10%	0%
Position the institution as internationally engaged	**49%**	39%	11%	1%
Increase the relevance and broaden the lecture and course material offer	42%	**52%**	6%	0%
Access to new funding opportunities	**37%**	**35%**	19%	8%
Increase revenue	17%	28%	**27%**	**29%**
Reduce fragmentation of the field of study	13%	**45%**	34%	8%
Reduce cost	10%	23%	**42%**	25%

IAU conducted a similar survey in early spring 2022 for Sub-Saharan African universities, and the findings were similar.

As stated in the report:

> "It is positive to conclude that institutions across Europe see the enhancement of quality, specialization, capacity building and career development as the incentives behind co-creation and sharing of doctoral education as these goals are essential for developing doctoral education in all countries around the world."

Even though only 33% of the respondents viewed cost reduction as very/important, cost reduction is observed as an important reason for many universities exploring possibilities for the sharing of courses. Increased revenue may, in many cases, also justify Universities entering OPM-partnerships. Therefore, money and efficiency as motivation should not be underestimated.

1.6. The innovative aspects

Doctoral education in Europe reflects the Salzburg principles and recommendations (2005). The European Commission recommended seven principles for Innovative Doctoral Training in 2011, research excellence, attractive institutional environment, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance.

Now co-creation and sharing of courses offer a number of innovative opportunities. Co-creation invites students and colleagues to develop a course, its content, the pedagogy, as well as the teaching and learning. Open Educational Resources with the five Rs (see Chapter four) is a catalyst for innovation. To have the opportunity to retain, reuse, revise, remix and redistribute course material, simplify creation and sharing and has the potential for important cost savings. Most importantly, it has a huge potential for innovation. For this reason, digitation of course material, the digitalization of communication, learning and teaching processes enable the inclusive digital transformation of doctoral education.

CHAPTER TWO

2.1. Preparing for co-creation

2.1.1. Setting the scene – initial analysis

When reflecting on initiating course co-creation, different partnerships might be considered. Sometimes an existing partnership is engaged or a new one might be considered. The type of partnership that is considered will influence the advancement of the work.

This handbook aims to support bottom-up initiatives, guiding academics that want to internationalise their work on content without having a huge budget or "everything in place". Many initiatives observed today are strong top-down initiatives, like the European University Alliances and the "platforming" trend. This handbook demonstrates that bottom-up initiatives can be achieved by considering the right elements at the right time.

It is important that the partners agree on common goals early in the process. Another step to be completed early in the process is to conduct an evidence-based needs analysis, or a gap analysis, which is the same. In other words, when the goals have been agreed on, the gap between the actual situation and the desired situation is then identified, and the needs detected are addressed. Needs may be interpreted as desired changes and could be sorted in the following categories: primary (must be addressed) and secondary (could be addressed if resources allow). A full description is given in the Erasmus+ Handbook on the lump sum funding model, Annex I, p25-26.

Other analyses which might be helpful when designing your project are:

- analysis of the projects Strengths, Weaknesses, Opportunities and Threats – a SWOT analysis;
- analysis of which stakeholders should be involved in the project and how they should be addressed throughout the project lifetime – a Stakeholders analysis.

When anchoring the process of finding partners for co-creation, considerations may include, but are not limited to:

- individual institutions conduct a needs analysis (SWOT);
- examine and discuss the findings from the analysis with prospective partners;
- determine ambitions and goals of the partnership;
- discuss areas that each partner has a comparative advantage;
- understand a prospect's organisational structure and aims
- agree on a balanced use of existing resources (suitable quantity and quality) to initiate the co-creation process;
- set framework and guidelines for the cooperation;
- start of the co-creation process.

2.2. Agree on co-creation, ambition and specific objectives

Once the initial analysis has been completed, the co-creation process should ensure that involved parties agree on a systematic and innovative way of collaborating. This may include exploring challenges, and opportunities and reaching a compromise (develop a culture of openness and mutual respect) for setting up a successful partnership. Partners should consider making use of available infrastructures while trying to adapt accordingly. It is often advisable for example, to resort to existing partnerships and projects in an institution.

Other ways of accomplishing a co-creation process may include the use of known processes such as the Design Thinking methodologies. One of the most well-known resources for exploring design thinking is the Stanford d.school.

When embarking on a co-creative process, the level of expectations and ambition could be decisive in what outcomes will be reached. As expectations and ambitions of members could differ, it is imperative to critically examine the individual ambitions and expectations and decide on where one needs to compromise to ensure a positive outcome for all partners.

2.3. Initiating a project

Depending on variables such as size, depth and complexity of your work and partnership, you should consider organizing it as a project. Our recommendation is to do that. If your collaboration involves digital transformation, you should use the project format. The same goes for initiatives where you apply for European funding, e.g. for Erasmus+ - then you have to organize it as a project.

The demonstrator course for this handbook, "Digital Transformation" (https://idocos.eu/), contains two thematic components relevant for projects:

- Management – analysing and applying ways to accomplish tasks and achieve goals, using systematic planning, organising and control of functions and processes.
- Project set-up and implementation.

The last element, in particular Project set-up, is relevant to this chapter, and the theme is also covered in depth in the Open Access book supporting the course: "Digital Transformation, Organisations, Processes, Decisions", chapter 9. To manage projects (Ekenberg & Al, 2023). Detailed guidance and support will be found in this book.

The scope of this handbook concentrates on what should be considered when a project aims to go through the following four phases: planning, preparation, implementation, and follow-ups.

Table 2: The four phases of a project for co-creation and sharing of courses – online and blended

Planning	Preparation	Implementation	Follow-ups
Identify the need – provide course idea Gather partners Validate the need and course idea – needs analyses Consider a SWOT analysis Conduct a stakeholder analysis Map for similar initiatives Agree on learning outcomes and outline of course content and design Identify learning materials Identify relevant OERs and OA publications Agree on the place of the course the partners higher education systems Clarify approval of credits/degrees Clarify quality assurance/enhancement Ambition and mode of co-creation and sharing Digital readiness mapping of partners and students	Specific planning of activities and practical arrangements, specify all target groups, facilitate awareness of all actors with responsibilities in the project to be prepared for launch Prepare information and communication according to the stakeholder analysis When needed – prepare senior management Oversee the specific schedules Oversee possible digitalization processes	Kick off according to agreed project plan Draft/modify course content adapted to flexibility and online design Draft/modify/decide on learning materials including assessment support Clarify and adapt to pedagogical challenges/requirements coming from online and blended provision Clarify/adapt to Learning Management Systems, LMS and to management of the learning process Produce and make available the course and learning materials in digital formats Adapt the course package to flexible, blended and online provision	Evaluate the course, the learning process and the partnership – also with regards to impact Consider take up activities (results and experiences) Consider and decide on possible other follow ups Communicate and inform according to your stakeholders analysis

Clarify the digital ecosystem for course co-creation, sharing and provision Rough specification of the digital platform to be used Identify possible supervisors and needs for student and supervisor/teacher support Risk analysis Formulate specific objectives for your project activities Mode of cooperation and setting up the project structure Overall scheduling Clarify the need for budget and resources Draft and agree on the project plan	If digital transformation – oversee that all competencies and capacities needed will be available in due time	Adapt the student management system to the course package Clarify the need for learner and teacher support Facilitate student and supervisor continuous feedback Execute the course	Agree on sustaining the initiative

2.4. Digital transformation

Since many working on course co-creation and sharing are involved, at least partly, in digital transformation, this handbook provides an overview, links and suggestions to help navigate through transformation processes.

2.4.1. DT and sustainable development are climbing high on the agenda

Digital transformation (DT) and Artificial Intelligence (AI) are recognised as two of seven global megatrends identified in 2022 by Australia's National Science Agency in their once-in-a-decade report Our Future World: Global megatrends impacting the way we live over coming decades (Naughtin & al, 2022). The other five megatrends suggested are adapting to a changing climate, leaner, cleaner and greener, the escalating health imperative, geopolitical shifts and unlocking the human dimension. How these seven trends will affect businesses, organisations, governments and citizens worldwide, will vary between regions and countries, for example for low-income countries where lack of connectivity is a main issue. However, as a macro analysis of what is long-term happening in our world – the report provides an interesting and relevant helicopter view. While DT can be regarded as a process – AI could be seen as a technology, or group of technologies and a component of DT.

The Covid19 pandemic accelerated DT and functioned as an eye-opener for the world to understand the possible good and not-so-good impact from DT. For example, for higher education, one could observe how most universities in Sub-Saharan Africa had to shut down overnight. In Europe, most universities could quickly shift to remote teaching.

The European Union prioritises digital transformation and sustainable development, both in its policies and programmes. For education EU has launched the Digital Education Action Plan (2021 – 2027), and for Europe the European Commission launched the Digital Decade policy programme in July 2022. At the launch, the Commission stated in its press release:

> "The Digital Decade policy programme is the way towards a more innovative, inclusive and sustainable future for Europe. Unlocking the potentials of the digital

transformation, specifically by setting up and implementing multi-country projects, will pave the way for a competitive and sovereign Europe".

Today DT and AI are some of the main issues climbing on the policy agenda, to support the implementation of the Sustainable Development Goals. The United Nations Secretary General suggested in his 2022-report "Our Common Agenda" to improve digital cooperation as one of 12 commitments. A Summit is planned for 22-23 September 2024, which looks at the Future, to agree on a Global Digital Compact, building on the Secretary-General's Roadmap for Digital Cooperation (UN, 2020). This was supported by the High-Level Political Forum for the SDGs 2022, which also gave DT high priority (UN, 2020) in its ministerial declaration for the first time.

As for other parts in society, the Covid-19 pandemic accelerated digital transformation of higher education, still most universities have not entered prioritized DT-projects. This means that a huge transformative process has started both for the SDGs and in adopting DT at universities, but globally speaking, we are still in the beginning. Research by the BCG (2020) shows that around only about 30% of companies navigate digital transformation successfully. There is no reason to believe universities navigate better.

2.4.2. The need for a higher education DT process framework

To reap the benefits and handle risks and challenges, a framework for DT is helpful. This is the case either it is a part of the university functions that is digitally transformed "end-to-end", for example online education, or the university takes on a comprehensive DT, considering all its four missions, education, research, innovation and service to the society.

A DT framework could roughly be divided in three phases, and DT is not a finite process, see the process framed as a circle in Figure 8 below:

Figure 8: The phases are with inspiration from Slidebooks consulting (2021)

In the study "Digital Transformation in Higher Education: A Framework for Maturity Assessment" the researchers explored and recommended a framework for maturity assessment, based on experiences from the United Arab Emirates, which also is an advanced country driving digital transformation (Marks et al, 2020). The framework is based on Deloitte´s (2019) digital transformation assessment framework. It includes four processes: Learning and teaching, Enabling – e.g. library services, research and planning and governance.

They also mapped challenges for DT in higher education, holistic vision (1), personal competencies and IT skills (2), data structure, data processing and data reporting (3), redundant systems (4), third-party reporting systems (5), manual entries - middle man (6), potential use by customers (7) as the most important (identified by 28-78% of the respondents).

Little research exists on frameworks for higher education. While many top-rated consulting companies offer such frameworks, including maturity assessments, few details are publicly available, probably because it is a part of the company's business case. The paper "Deep dive into DT in Higher Education institutions" (Alenezi, 2021) discusses seven existing consulting companies' models for incorporation of digital transformation in higher education institutions. In addition, it discusses more in detail the KPMG framework, the Microsoft framework, and the Google framework. To address higher education lagging in DT, the paper suggests focusing on poor prioritization, decentralised decision-making, internal resistance, digital literacy of the faculty and a narrow view on return on investments.

2.4.3. Putting the two things together, inclusive DT for sustainable development

DT is agnostic and can be implemented for the good and the bad. Therefore, DT needs direction and mission. For higher education, it is natural to look at SDG 4: To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The UN is organizing a top summit Transforming Education in September 2022. In its discussion paper for Digital learning and transformation, three recommendations and three principles are suggested as guiding direction for DT. These recommendations and principles can also serve as a good input for higher education institutions when entering or re-entering DT (Figure 9).

	Principles		
Recommendations	Put the most marginalized at the center	Free, high quality digital content	Pedagogical innovation and change
1. Ensure connectivity and digital learning opportunities for all	✓	✓	✓
2. Build and maintain robust, free, public digital learning content and platforms	✓	✓	✓
3. Focus on how technology can accelerate learning by enabling evidence-based instructional practice at scale	✓	✓	✓

Figure 9: Recommendations and principles for DT in education – SDG 4 (UN 2022)

CHAPTER THREE

3.1. Regulatory frameworks and partners agreement

3.1.1. Legal framework and recognition

When searching for partners, see Chapter three, one should have an idea of what kind of collaboration (course, programme or virtual exchange) one aims for as the requirements for recognition vary between countries, regions and global scope.

It is important to consider and decide on the context and model for co-creation and sharing to identify the legal and administrative issues one needs to address.

- Model 1 – Partners co-create and share the same course to be recognized and provided by all universities.
- Model 2 – One university ensures the provision of the co-created course to students from several universities.

Several variants of the models could be considered, for example that a few universities co-create and share with many more. In model 1, reciprocal recognition of the course is needed for all partners. In model 2, students at partner universities receive credits from the university providing the course.

The decided model may have implications related to the practical implementation of the course provision. In model 1, the course can, for example, be implemented into each partner university's Learning Management System (LMS) or be provided by a shared platform. In model 2, the course is provided by the hosting university's system. The practical solutions for course provision are discussed in more detail in Chapter five – Course sharing for online and blended provision.

3.1.2. The legal hierarchy for recognition of qualifications concerning higher education

The recognition process will depend on the situation in each partner country.
The overall hierarchy could be summarized as:

- Global Convention on the Recognition of Qualifications concerning Higher Education (adopted in 2019);
- UNESCO's Regional conventions (e.g. the Lisbon convention for Europe);
- National legislation;
- National accreditation/quality assurance agency;
- The university.

The Global Convention was unanimously adopted by UNESCO's 193 Member States during the General Conference in November 2019. It is the first UN treaty on higher education with a global scope, and is a critical normative framework for re-thinking and reimagining the internationalization and international collaboration of higher education institutions. The Convention has now entered into force.

UNESCO has also published a practical guide to recognition in support of implementing the Global Convention.

3.2. Mapping the status

To have an overview of the status for recognition, one should check the status for recognition of courses:

- at each participating university;
- consider consulting the national agencies (or ministries) in the countries concerned;
- in Europe, consider consulting the national ENIC-NARIC networks;
- the IAU WHED Portal could also be a useful resource as it provides authoritative information on higher education systems, credentials in 196 countries and territories and over 20,000 officially accredited or recognized higher education institutions (HEIs).

The regulatory status for countries in Europe is very well described in the publication Implementing Joint Degrees in the Erasmus Mundus action of the Erasmus+ programme (2020). There are two important take-aways from this handbook: 1) In almost all countries (except Germany and Turkey), the set framework applies to Bachelor, Master and Doctorate level. 2) There are two main regulatory bodies: Universities themselves are mandated to accredit courses and programmes, (e.g. Norway), or national authorities/agencies (e.g. Sweden).

When the status and required procedures are mapped, the process and timeline can be set up for obtaining the recognition and related credits and for the credits to be mutually recognized among partners.

Sometimes the process for accreditation and recognition is cumbersome and may take a long time, up to half a year, or even a year for programmes. In our experience, the process must be correctly initiated at each partner university, starting with the unit/s responsible for the topic/s and thereafter respectfully nursing the process until the final decisions.

There is an ongoing discussion on establishing a European degree in the EU. The initiative wishes to simplify internationalization and collaboration among universities. This discussion is closely related to the new European University Alliances (2019 and onwards). While the alliances have already been established and received support, a possible European degree is being disputed, among other concerns, because it can be seen as a threat to the autonomy of universities and countries.

3.3. Global state of play

For regions outside Europe, other conventions are relevant, e.g. the Addis convention in Africa. Similar mapping of conditions is necessary and a more complex process, between south and north, might require an even more detailed process management and timeline to ensure to obtain the desired mutual recognition.

3.4. Partners/universities agreement

Partners initiating international cooperation on courses must have an agreement in place before implementing the project. Nevertheless, much can be done without an agreement, especially in the preparatory phase. Sometimes, e.g. when significant resources are involved, a letter of intent can be issued among partners, on 1–1,5 pages expressing the intention to undertake a specific project in partnership. A letter of intent is a non-binding agreement that still serves to keep partners committed. The agreement does not have to be complex but should describe the most important issues the partnership need to deal with and have the project plan/description as a part of the agreement. In more complex projects, where external funding is an issue, e.g. from the national research council or the European Commission, there are clear guidelines for what a consortium agreement should contain. See some examples in the following section.

3.5. Consortium agreement – templates

Below are links to some templates that can be considered for more complex projects, e.g. joint programmes or Horizon projects. For projects only comprising a course or a few courses, one should aim for simpler agreements.

- University of Helsinki, Finland, Agreement template
- The Research Council of Norway Template for Consortium Agreements
- Joint Programmes from A to Z, page 61 – 63
- Guidance How to draw up your H2020 consortium agreement
- Erasmus+ partnerships that includes mobility

3.6. Resources and budget

The need for extra resources and budget will vary very much and depend on several variables that should be carefully considered by the partners in the beginning of the work and before the project is formally established and implemented. What is important is that many activities can be done without extra funding and by keeping the project low-key.

A key exercise is to consider what the added value of your initiative is and how it can be specified. Then use this analysis as a justification for your request for/use of resources.

Among the questions to be reflected on are: What are the full costs of co-creating and running your shared course? What are the additional operational costs? Is there funding for this? From where? And how will each partner institution deal with the funding issue? How will the balance be achieved within the consortium?

As activities, participation and complexity increase, defined resources and budget are needed and should be established, these could come from within each unit, from each university or can be based on external funding, e.g. the Erasmus+ programme. An example of such an activity is the Nordic Research School in Innovation and Entrepreneurship, NORSI, see chapter 5 and the Appendix. It is based on a mix of the partners' resources and external funding. The partners allocate a great number of their own resources into the work because the value delivered from NORSI is regarded very highly.

Whatever is agreed regarding budget and funding should be added to the partnership/consortium agreement.

CHAPTER FOUR

4.1. Concept of co-creation

Innovation has become the hallmark of all decisions and the desire to do things differently for effective and efficient results: Co-creation is the solution to the numerous innovation challenges. Co-creation could therefore be defined as the new modes of engagement between people to either create shared value or unleash the creative potential of diverse groups for the benefit of all partners (Rill & Hämäläinen, 2018). The utilitarian value of co-creation for all members involved has necessitated the paradigmatic shift for co-creation. The co-creation paradigm is about (Ramaswamy, & Ozcan; 2014 p. xvii)

- interactions as the locus of value creation;
- jointly creating and evolving value with stakeholding individuals;
- harnessing open and social resources of individuals and their skills on the one hand, and enterprise and network resources of multiple private, public, and social sector enterprises on the other, as a joint resource base;
- innovating engagement platforms as the means of connecting joint value creation opportunities with joint resources through agential actions;
- leveraging ecosystems of capabilities based on a meshwork of social, business, civic, and natural communities to engender new value creation capacities;
- individuated experiences as the basis of outcomes of value.

Considering the mutual benefits that partners could enjoy when a co-creation agreement is reached, all partners need to agree and ensure that the following characteristics are present at both ends (Rill & Hämäläinen, 2018; p. 7),

- having the right people in the room, to ensure sufficient autonomy;
- a feeling of safety to express all ideas, and a shared lexicon in service of that goal;
- an explicit understanding that process is equally as important as content and is similarly subject to discussion and improvement;
- and ultimately that everyone there understands why they show up each day and feels supported in checking in with that foundation to shape our understanding of each other and a shared “Why” that we can calibrate output against at every stage of development.

Co-creation in which academics at different universities, in at least two countries, create one or more doctoral courses, may or may not include doctoral candidates. Nevertheless, we believe that to include PhD candidates in co-creation is a key element to achieving the wanted benefits, ref. Chapter one. The ladder of participation is important to consider in this context. (Wills and Gregory 2016). Students should act as active partners and will, as Fraser and Bosanquet (2006) describe, ensure that curriculum development is a collaborative process of learning with the teacher and student acting as co-constructors of knowledge.

The concept of co-creation and sharing may be new in some institutions, hence there is a need to mentally prepare the staff concerning the processes involved in such a venture. Such steps may have to be planned and incorporated into a project in order to engage and promote the sense of belonging for all.

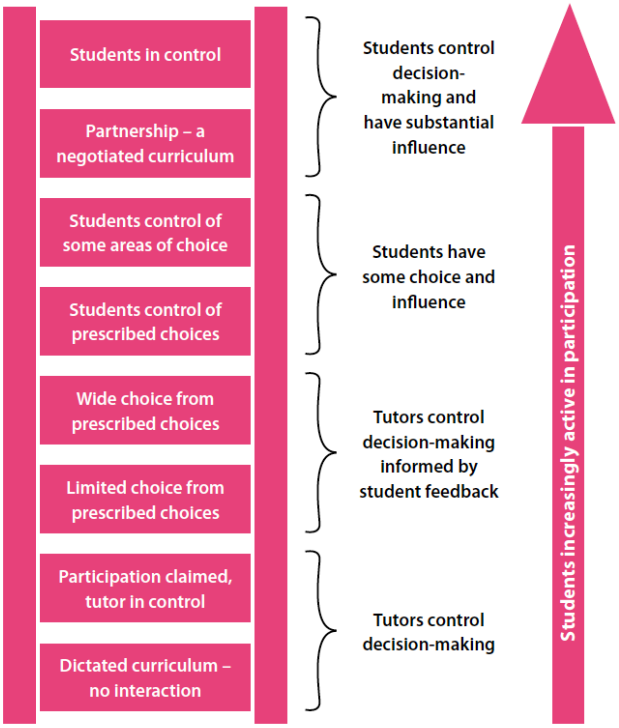

Figure 10: Ladder of student participation in curriculum design, (Bovill & Bulley, 2011 p.180).

4.2. Open Education Resources and Open Access – crucial for co-creation and sharing

This handbook is meant to be a catalyst for increased internationalisation, co-creation and sharing of doctoral courses. Similarly, Open Education Resources (OER) and Open Access (OA) are catalysts for innovation in education (Orr et al., 2015).

Primarily this feature lies in the 5R Activities of OER where an open license permits users of a resource to (CCCOER 2020)

- **Retain:** Make, own, and control your copy of the content;
- **Reuse:** Use the content as-is;
- **Revise:** Adapt, adjust, modify, improve, or alter the content;
- **Remix:** Combine the original or revised content with other OER to create something new;
- **Redistribute:** Share your copies of the original content, revisions or remixes with others.

Whether an OA resource is a full OER depends on the specific licence. See the 'overview on licenses at CCCOER'. Decide on the license is important when starting up the project for co-creation and sharing. Would open license or a strictly copyrighted option is better? Note that if your project is funded by the EU, an open license must be used. Which open license? Would you allow others to adapt, revise and commercialise your work? See the Licence chooser at Creative Commons.

CC BY is the most used license, with all Rs intact: This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use. CC BY includes the following elements: ⓘBY – Credit must be given to the creator. Creative Commons about licenses. It is required to give appropriate credit, provide a link to the license, and indicate if changes were made. This may be done in any reasonable manner, but not in any way that suggests the licensor endorses the user.

The ability to innovate depends on the capacity of the OER users. Good knowledge on OER and its practical use is necessary. To go deeper into this, the book The OER Starter Kit (Elder, 2019) is recommended. In addition to being a great resource for practical use of OER, it is also an example of how an OER can be adapted to new, valuable resources. It has already been adapted to eight new and highly useful handbooks.

4.3. OER – state of play

OER and OAs are widely recognised, but still, a significant share of academics are not aware of or using OER. The Commonwealth of Learning, CoL, (mostly outside Europe) found that over 80% knew about OER, but few (26-38%) were aware of the most used repositories and platforms (CoL, 2021). SPARC Europe found that 60% of higher education libraries knew about the UNESCO OER recommendation (Santos-Hermosa et al., 2021), while a survey conducted in Europe by the Encore+ project found that while over 80% of professional educators were aware of OER, two-thirds responded to use OER regularly or occasionally. The same educators thought their organisations had a lower level of usage (Ehlers & Kunze, 2021).

In an US survey, a main finding was that faculty and administrators expressed growing acceptance of digital courseware compared to earlier surveys, with 74% of both faculty and administrators saying that digital materials provide students with greater flexibility. The awareness of the term OER as well as licensing options had grown to 57% (up 7%). The faculty´s use of OER materials in courses has increased from 5% in 2015-2016 to 22% in 2021-2022. (Turning Point for Digital Curricula: Educational Resources in U.S. Higher Education, 2022).

4.4. OERs and OAs are goldmines – Quality to be considered

For those planning for co-creation and sharing courses, OERs and OAs are goldmines and useful in many aspects. The 5Rs significantly lower the complexity of the project, save time, and students save money. The opportunity is big for useful innovations.

Building on already existing OERs and OAs can be very useful – at the same time, quality should be carefully examined before a decision is made. This handbook highly recommends peer review as a method. OER repositories and platforms address quality through a variety of mechanisms: Peer review, reviewed by teachers/user reviews, ranking for usefulness in the classroom, combination of peer reviews for content quality with an adoption review and quality assurance in the production process. Examining how quality is taken care of, is a part of the selection process of resources. Some suggest a very structured approach for considering quality, Zawacki-Richter et al. (2022) consider that the low usage rate of OER is often linked to quality, provide an overview of quality assurance systems and suggest an Instrument for Quality Assurance of OER (IQOER). Table 3 shows the scale “academic foundation” of the IQOERs.

Table 3: The Academic foundation scale

#	Item	1	2	3	4	5
1	The OER contains references to subject-specific literature or research findings					
2	The content of the material focuses unilaterally on specific providers, products, or models					
3	The content is up-to-date, accurate, and relevant					
4	The reasoning in the material is coherent and comprehensible					
5	The presentation of the content is precise					

1 = does not apply at all, 2 = rather does not apply, 3 = applies somewhat, 4 = largely applies, 5 = fully applies

4.5. Online OER infrastructures

Many very good repositories and platforms for OERs are available. The chapter Finding Open Content in The OER Starter Kit offers good guidance. In the Appendix of this handbook, there is an adapted list of resources from The OER Starter Kit: Open repositories and search tools. For OA books and journals key repositories are the Directory of Open Access Books, DOAB, and the Directory of Open Access Journals, DOAJ.

To find and having access to relevant quality OERs is a challenge for the users, and several initiatives are in the making to help. An example is X5GON which aims to build the World's first ecosystem connecting Open Educational Resource sites for the collective benefit of everyone, everywhere.

Marin and Villar (2022) describe the current online infrastructures for OER. Figure 11 below shows the relation among digital knowledge infrastructures. Each of the categories are discussed more in-depth in their paper. From a doctoral course creation perspective, the Open Access repositories will have a more central role than indicated in Figure 11.

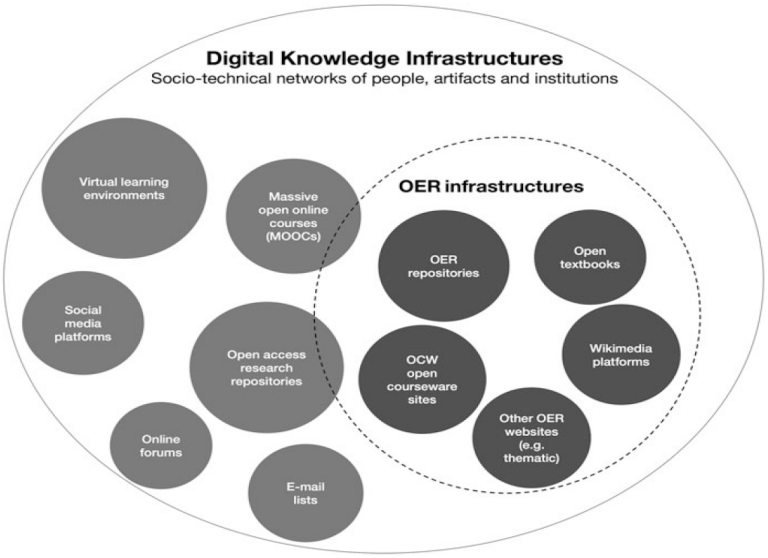

Figure 11: Relations between digital knowledge infrastructures and OER infrastructures (Marin & Villar, 2022)

4.6. OER and OA – regulatory framework

Member States of UNESCO (193) have adopted normative instruments in form a Recommendation on OER (2019) and on Open Science (2021), where OA is included and constitutes an important commitment, which is monitored through UNESCO.

Many countries have decided sector-specific policies for OER and OA and so have many universities. For this reason, mapping the state of play for the potential partner institutions should be done when planning the project.

European-funded projects (e.g. Horizon Europe and Erasmus+) will normally have a clause similar to:

> "if the beneficiaries produce educational materials under the scope of the project, such materials must be made available through the Internet, free of charge and under open licenses."

For a complete text on European funded projects, please see the Erasmus+ Programme Guide.

4.7. OER and OA handled in a project

Many initiatives have been launched to solve the issue handling open resources.

Repositories

Mega – meta – linked – available through federated search – AI governed search and more

Example1: https://www.merlot.org/merlot/index.htm

Example2: https://open.umn.edu/opentextbooks

Example3 course material: https://collection.bccampus.ca/

Open Access repositories

- Directory of Open Access Journals (DOAJ): Open Access journal articles
- Directory of Open Access Books (DOAB): Open Access books

Curated websites of variable quality

Example1: https://instr.iastate.libguides.com/oer/home

Example2: https://digitaljobs.women4it.eu/oer

Example3: https://vstage.eu/resource/

Which solution to choose for a university, a project, an international collaboration, or even a country, of course depends on several factors, among them the needs, level of ambitions and resources available.

In a smaller project like IDOCOS we have kept it modest and simple, which will probably be the case for most international projects working on co-creation and sharing.

The open resources are published on a curated page and at the same time registered at external repositories. OERs and OAs we find, select and use, (adopt) we register as references in the course and learning materials. Open materials we find and adapt to use we publish on our website, with respect to the license, and register at external repositories. See Figure 11 below.

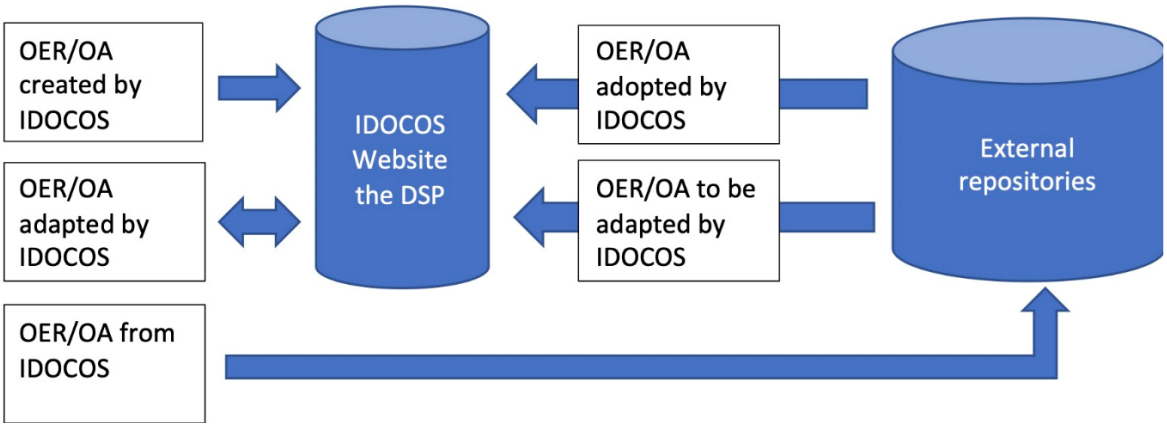

Figure 11: OERs and OAs – the flow

CHAPTER FIVE

5.1. Course sharing for online and blended provision

Sharing models – what is a shared course – processes and functions to be shared

There are several amazing sharing models such as the UBER and the COURSERA platforms, as well as the new online programme management platforms (OPMs). This handbook does not intend to provide such response with a monolithic advanced platform. Quite contrarily, our proposition is an unpretentious, practical solution on sharing courses on equal footing for shared benefits. We believe that all higher education institutions can achieve this.

Before deciding on the sharing model, an initial reflection should be made – why sharing and how to share?

- For example, the motivation could be to build a European University Alliance in which one or several universities share their (not co-created) courses with partners. This means students from partner universities enrol in each other's courses, for example, the NORSI consortium (see Appendix), where co-created doctoral courses are provided to partner universities. In addition, one partner university can provide its courses to partner universities. Both are examples of one-to-many sharing.
- Another model is when a course is (co-created and) shared and provided by the partners, in other words, a mutual understanding on equal footing for co-creation and sharing, a many-to-many sharing. This could be observed as a step in the de-colonisation direction, opposite to old models in which provision come mainly from north.
- A third model is when a Digital Supported Platform is introduced among partners, under the partners' full control, to facilitate (co-creation) and effective course provision. This may still be observed as many-to-many sharing although one-to-many sharing can also be provided within this model.
- The fourth model discussed in this work is where an external provider is in charge of a Digital Supported Platform. This could be a public provider (government), but today it is often a private, commercial provider – an Online Program Manager. HolonIQ has presented an overview of the global Online Program Manager landscape (Holon IQ, 2020).

We recommend that HEIs should take full control over and ownership of courses and content, whatever model that is chosen.

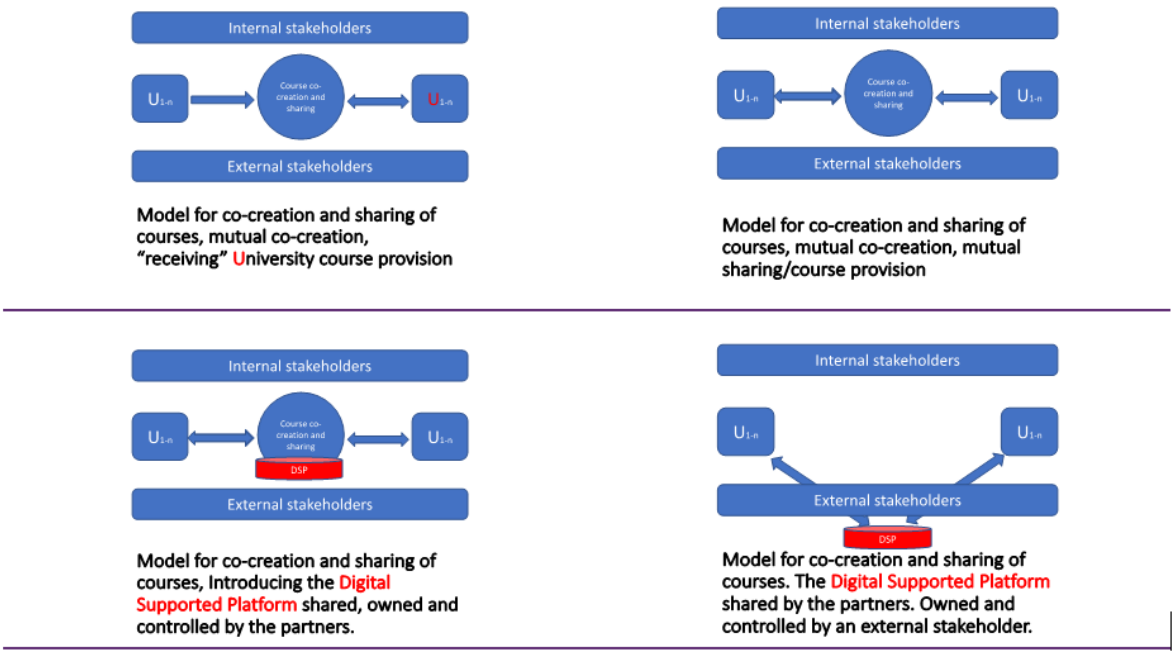

Figure 12: The four examples of sharing models

5.2. OPMs - The landscape

Online Programme managements (OPMs) have the role of the outsourcing provider of online learning, as described in model four above, in which the Digital Supported Platform is controlled by an external stakeholder. OPMs are often selected because universities do not have the capability or infrastructure to realise the work alone or may see OPMs as a better strategic option. The OPMs' commercial arrangements could range from profit share to fee for service.

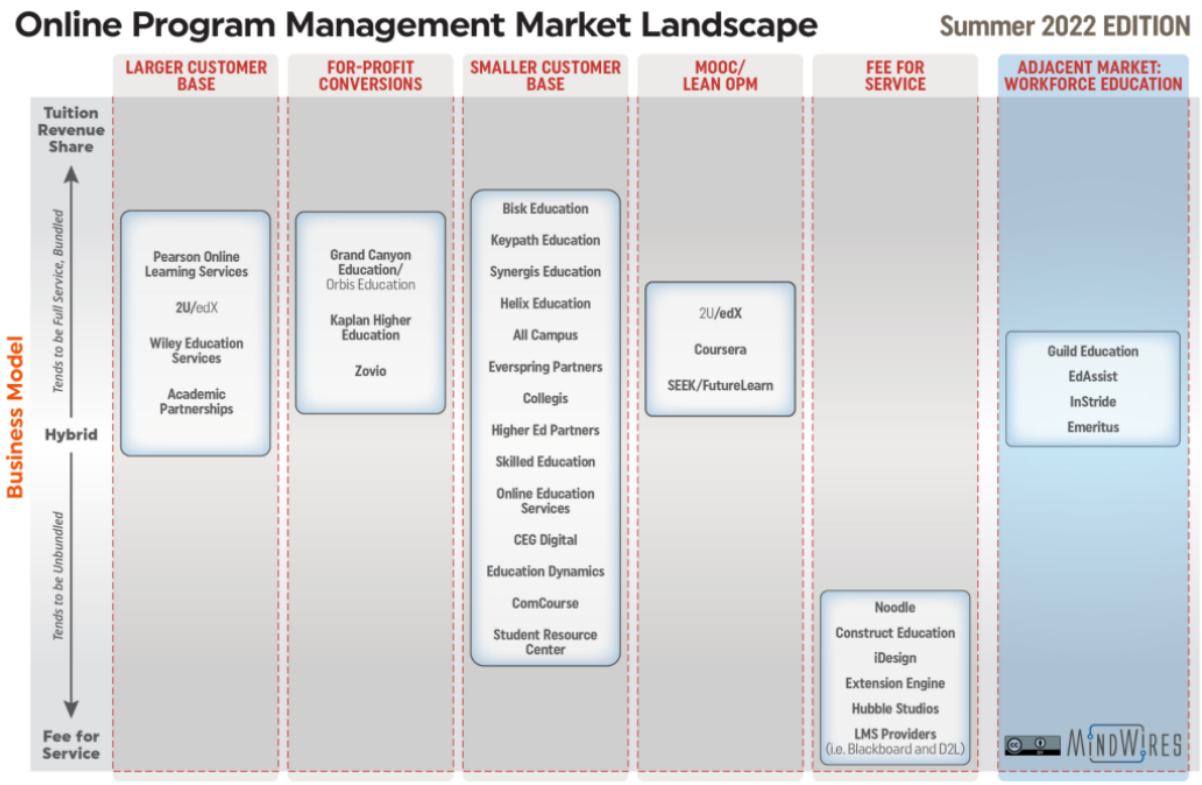

Figure 13: Online Program Management Market Landscape. Source: Hill (2022).

5.3. Examples of partnerships creating and sharing courses

5.3.1. Nordic Research School in Innovation and Entrepreneurship (NORSI)

NORSI aims to enhance and strengthen innovation and entrepreneurship research education and community in the Nordic region. Doctoral students within innovation and entrepreneurial studies enrol to take academic courses offered by NORSI and its partner institutions. NORSI is also an active network in the innovation and entrepreneurship research communities.

5.3.2. Nordic Doctoral Training in Health Sciences (NorDoc)

The activities of NorDoc aim to initiate, facilitate and intensify collaboration among the Nordic doctoral schools/faculties in all relevant fields for the benefit of Nordic doctoral candidates and their supervisors, to support and ensure the highest possible quality in doctoral education in health sciences.

5.3.3. Partnership for Enhanced and Blended Learning (PEBL)

The PEBL – East and West Africa is an initiative launched by the Association of Commonwealth Universities. PEBL academics have designed and developed a series of quality-assured, credit-bearing blended modules now available on OER Africa for universities within and beyond the project network to download and use.

5.3.4. European University of the Seas (SEA-EU)

The European University alliance – SEA-EU is an activity based on the principle of reciprocity: each SEA-EU partner university offers PhD courses to doctoral candidates from other partner universities. Each partner opens its existing transversal (and/or scientific) courses targeted to PhD-Candidates for the alliance (reserving a few places for SEA-EU members) or even creates new courses for the alliance.

5.3.5. Pan African University (PAU)

The PAU is an initiative of the Heads of State and Government of the African Union. It is according to its website a premier continental university network whose mission is to provide quality postgraduate education geared towards the achievement of a prosperous, integrated and peaceful Africa. Courses are shared throughout Africa by four local institutes.

5.4. Who should we include in the sharing model?

Key internal stakeholders to include in the sharing model are:

- Academics for creation and sharing;
- Relevant PhD candidates for co-creation;
- Librarians for contents and OER management;
- Instructional designers (where available) for support for course design;
- Technicians for communications, LMS and platform issues;
- Senior management to be informed and approve.

Partners as stakeholders are included through the agreed partnership model and the intended community of practices.

External stakeholders could be included depending on the national context and regulation.

5.5. Levels of sharing

Today most universities have an LMS, for example, Moodle (which is open source), Canvas (Instructure) or Blackboard to mention a few. The demonstration course for this handbook (https://idocos.eu/) uses the KTH Open edX platform. The Open Education Resource universitas (OERu) has developed an Open-Source Next Generation Digital Learning Ecosystem, where all components are open and can be run at very low costs (Lane & Goode, 2021). When choosing the solution, it is crucial that the partners are not "locked in" to a specific provider but can openly move data and content between desired platforms. If partners do not have a LMS available, they could use a Wiki for course co-creation, sharing and provision.

One should carefully consider the level of ambition when sharing courses, as a partnership, or consortium or European University Alliance. Sharing can be achieved through quite basic and simple technological solutions, as illustrated in the figure below: basic, pragmatic, and simple level. This handbook recommends starting with basic co-creation and sharing before building more advanced features such as shown in steps 3 and 4 (see Figure 14).

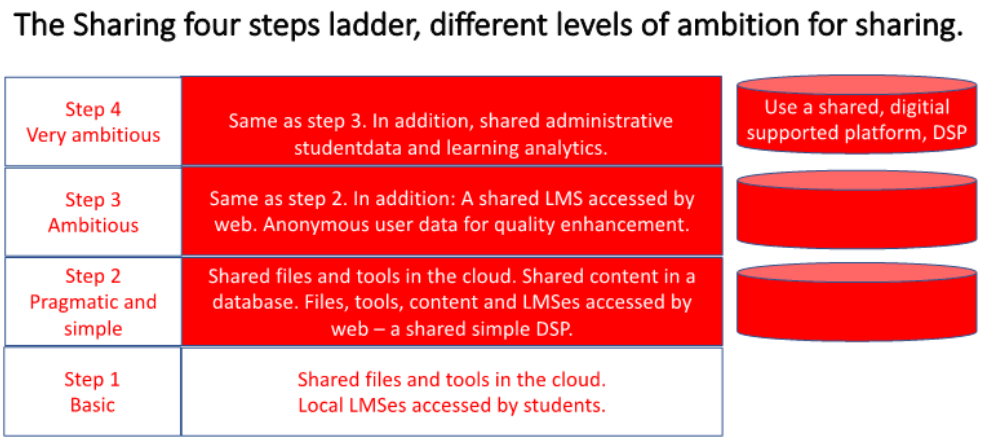

Figure 14: Different levels of ambition – the sharing ladder

5.6. The process for co-creation and sharing

A course can consist of different components: the course material, the literature, the designed process for learning (coached by teachers and assistants), the process for assessment, the social community of course participants, and the formal entity of the course and its legal decisions and credits. In principle one can share one or several of these components, except the formal entity of the course on a specific university. The process for course co-creation and sharing for online and blended provision can then be divided into seven steps.

Table 4: Steps for course co-creation

	Steps	Tools	Involved	Additional information
1	Initiate: Project design and plan	This Handbook, Open Tech tools, e.g., JITSI Meet and OpenProject, and templates to be agreed	Academics, PhD candidates, technical staff, librarians, senior management	
2	Co-create: Course co-creation and design for digital provision	Word processors, Open tools as BookStack Wiki, OliTorus. Virtual meetings: e.g. JITSI Meet	Academics and PhD candidates	First draft should have a simple design. Avoid producing costly course material before it is clear the course works
3	Design: Second draft – a more advanced and final design	Video creation, quizzes. Wiki for final co-created design, open tool OpenShot	Academics, PhD candidates and technical staff	
4	Share: Sharing course on a digital supported platform	LMS. Import content created to the platform, e.g. the Moodle or the open edX platform	Technical staff and librarians. An academic for quality assurance.	
5	Prepare course provision	Web, social media and email for advocacy. LMS for registering students.	Academic administrators, communications officer.	
6	Learn and teach: Provide the course	LMS, and open tools, e.g. Mastadon, OCTOPUS and OBS.	Supervisors and students. Technical support for students and supervisors.	
7	Evaluate and improve first course version, sustain the initiative	Then, agree on how the partners will sustain the initiative.	Academics, PhD candidates, technical staff, librarians, senior management.	Based on experiences modify course content, design and tools. If the partners have anonymous aggregated from the course provision, these can be used for quality enhancement.

5.7. Tools for online teaching and learning

Some basic tools and a selection of open tools are introduced in Table 4. We would like to highlight that tools are different from resources. Course resources are discussed in chapter 5 (OER and OA). In the book Improving online teaching. Practical guide for quality online education (2022), tools are discussed under six headlines: 1) Search engines and content curators, 2) Personal/social communication tools, 3) Content creation tools, 4) Collaborative tools, 5) Creating activities, and 6) Tips for using digital tools in online education. For the more in-depth discussion of tools, please have a closer look at this recommended book.

IDOCOS has identified and described open tools for all steps in the value chain co-creation and sharing of courses in an online and blended context. These tools are also referred to in the column Tools in table 4. In addition, all the tools can be found with description under: https://idocos.eu/dsp-tools.

Figure 15 illustrates a diagram where we can visualise where each tool should be used during the co-creation and sharing process.

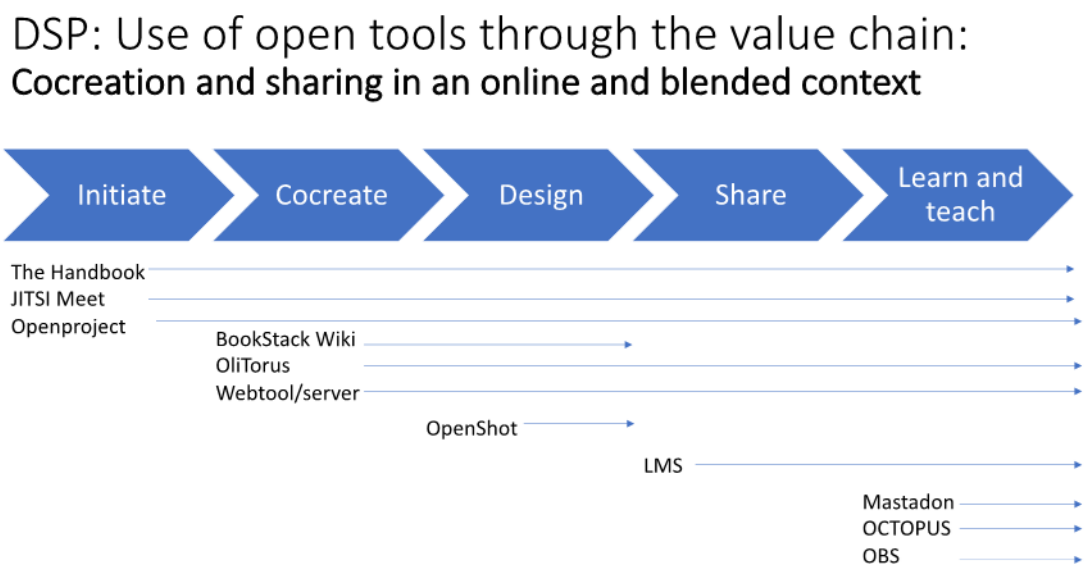

Figure 15: Open tools for co-creation and sharing

5.8. A simple digital supported platform for co-creation and sharing

Every university can create, together with partners, a digital supported platform. This section provides a brief suggestion for how and what processes need and could be supported. As an illustration, the IDOCOS website (https://idocos.eu/) is based on step two in the sharing ladder.

The staff support for the platform could be divided into three:

- The people who have access to the platform´s internal resources through its intranet.
- Collaboration on coordination of the shared platform, resources, and support. This is also the operational management of the platform, which ensures content and technical interoperability and proper database functions for the content (courses and learning materials).
- Content co-creation and course design to be produced by the academics with support from e.g. instructional designers and IT-staff. Supervisors have access to an internal collaborative tool and teacher support.

The external access to the platform:

- Students have access to the learning management system where the course is provided, all course-related material, student support system and other systems when agreed.
- Supervisors and staff have the same access as students.
- External stakeholders have access to the external website.

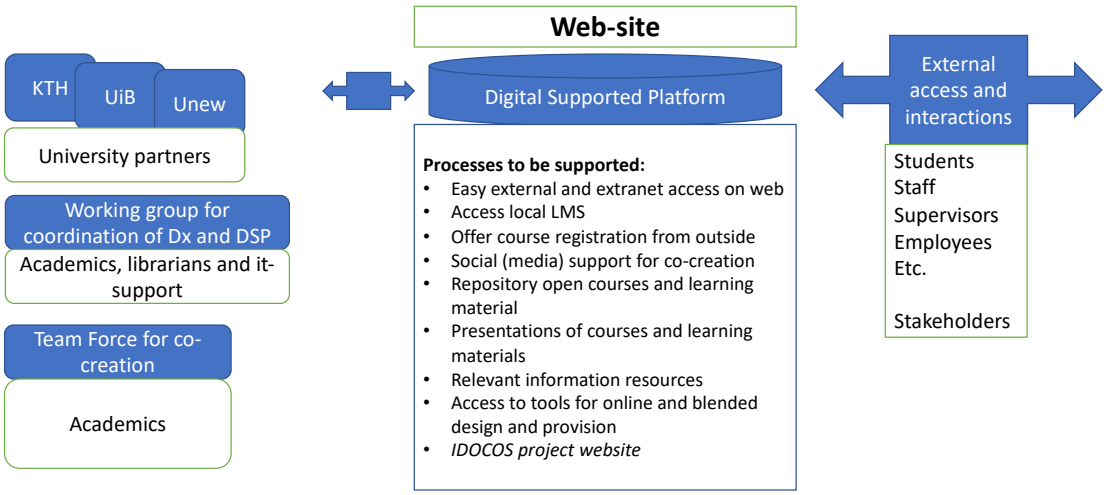

Figure 16: The Digital supported platform for the IDOCOS EU project

CHAPTER SIX

6.1. Course provision

6.1.1. Course design and structure

The structure of PhD programmes in partner institutions may differ and these differences call for a critical look into the execution of the course(s) that partner institutions co-create. To give students equal opportunities to enrol in such course(s), all course(s) co-created should, if possible, be taught every semester. This will help students who are not able to take it during the first semester because of the structure of the PhD programme can have the opportunity to take it in the subsequent semester.

For accreditation and validation purposes, it is proposed that individual institutions make the local decisions on how to include the course(s) in their list of accredited courses with local rules and regulations at the respective institutions. It is also suggested that the validation (i.e. its comparability, number of credits etc.) of the course(s) should be done at the local level but the course should, as a doctoral course, not be less than 3 ECTS credits or its equivalent. However, one might consider a more flexible approach to credits, ref. the European Council recommendation on microcredentials: "To strengthen lifelong learning, the Council recommend member states to adopt a European approach to microcredentials and in particular to apply a common EU definition, EU standards and key principles for the design and issuance of micro-credentials. Micro-credentials document the learning outcomes that a learner has acquired following a small volume of learning".

The designing and provision of a course are usually underpinned by the role of the instructor and the student in the teaching-learning process. However, as highlighted by Kop and Fournier (2011) in this 21st century, where the emphasis is placed on the individual student's thinking and creation of new knowledge, the goal of any such course should be to challenge learners into learning how to learn about the course topic, so that they can become self-directed learners. This then calls for adaptation to innovative strategies that will help students to become self-directed learners instead of the instructor just conveying a bunch of factoids that they can look up online or in a book. One major factor to be considered when creating courses is the mode of interaction of learners (i.e. whether synchronous or asynchronous). It is important to consider the time zones for your prospective students to decide which of these modes of interaction will work or if possible, a blend of the two. It is therefore recommended that partners should decide from the onset how students in these courses will interact and design activities and discussion assignments that will help achieve this.

To ensure that the structure and design of the course meet both local and international standards, the current handbook adopts Martin, Bolliger, and Flower's (2021) online course design element (OCDE) instrument. The OCDE instrument includes five categories (Figure 16).

Figure 17: Online course design elements

6.1.2. Overview

An overview should provide the learner with the information that is needed to start the course and this can include the course goals, student expectations, participation, assignments and anything that will help the individual learner to be able to start the course successfully. An example is shown in Figure 17 below.

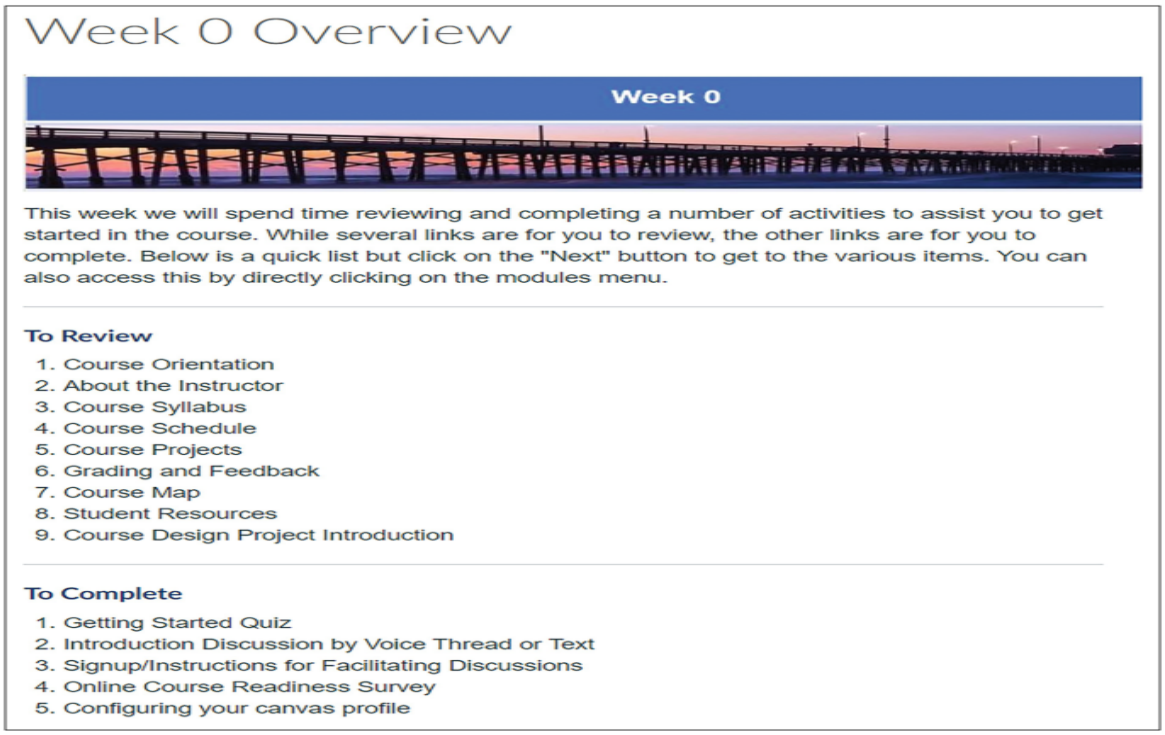

Figure 18: Introductory information overview

6.1.3. Content presentation

In this section, the course objectives have to be clearly defined and the required readings and tasks spelt out completely and accessible to all learners. It is always important to provide a clear overview with detailed instructions of what the unit is about, what are the expectations and duration for each unit and tasks clearly stated.

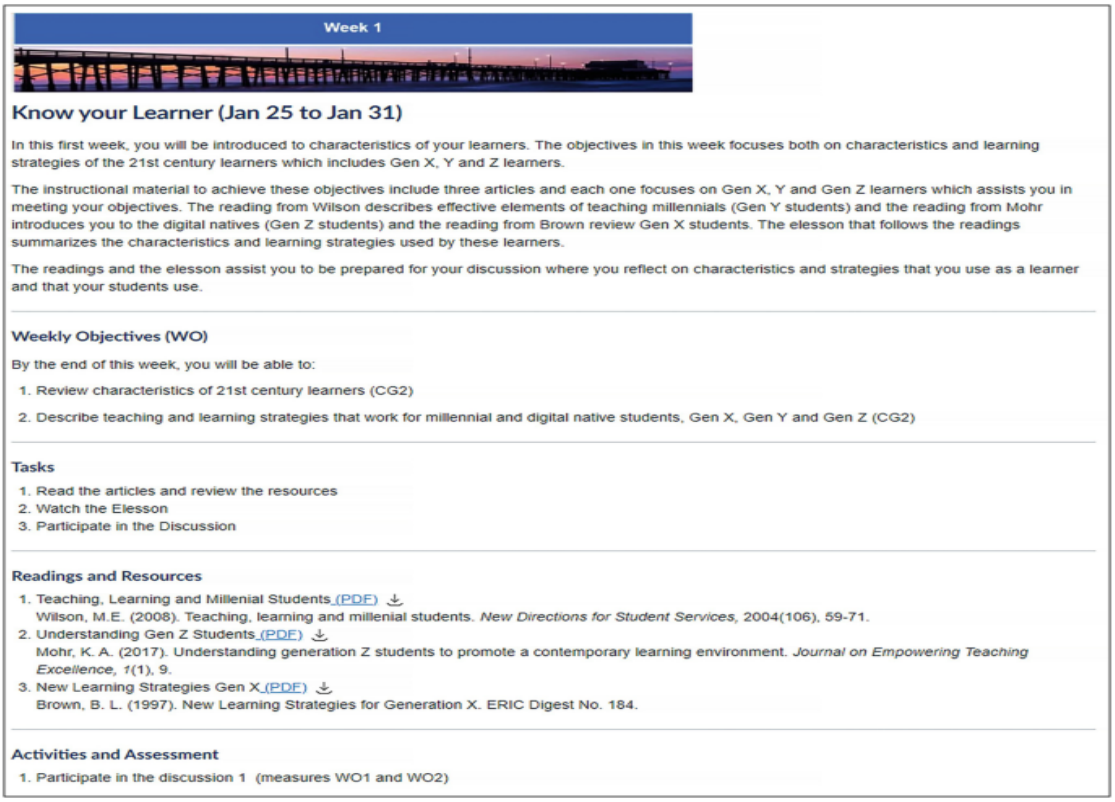

Figure 19: Structure of the course

6.1.4. Interaction and communication

Active engagement of students in the teaching-learning process is very crucial and hence there is the need to provide such opportunities for all students during the course duration. It is therefore imperative for course designers to provide a vivid description of the different discussion activities in the course, expectations for each activity and rubrics for assessing students learning in such activities.

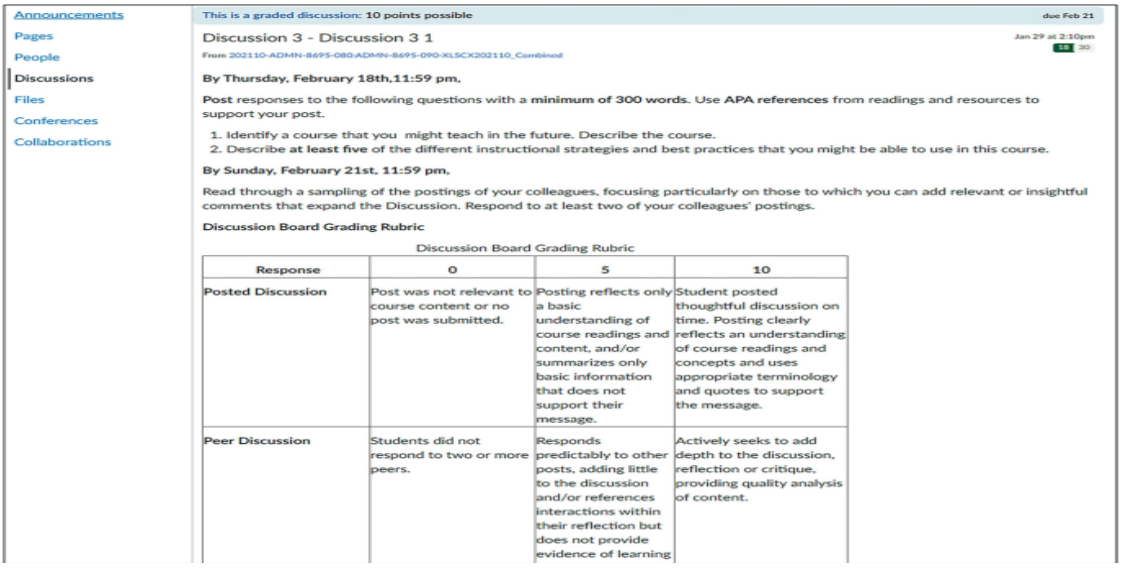

Figure 20: Example of discussion activities

6.1.5. Assessment and evaluation

The assessment criteria to be used has to be made clear to all participants regarding how many formative and summative assessments and the nature of assessments used should be made explicit. Additionally, learners should be made aware of the weight of each assessment type and the expectations from each task be spelt out. Feedback is an important component of teaching and learning. The instructor and course designer has to provide additional information on how feedback will be provided and by who (i.e. instructor feedback, peer-to- peer feedback).

6.1.6. Support

Providing continuous learner support throughout the course duration is very critical and there is the need for a dedicated section in the LMS, where the individual learner could visit for additional support through the watching of videos or additional materials which are easily accessible and do not require the use of any sophisticated device to access. The same goes for teacher support.

6.1.7. Theoretical foundation underpinning the course

In addition to the elements described above, the theoretical foundation of the course should be discussed among partners and clear decisions should be made as to the theoretical foundation underpinning the course, in other words, whether it is Instructivism: knowledge transfer from an expert; Constructivism: constructed self-discovery (often guided by an expert) or Connectivism: networking with connections to gain knowledge or skills (Crosslin, 2018). It is worth noting that PhD courses are designed for learners with diverse characteristics. For this reason, we should ensure that the course embraces the ever-changing diversity in our education in general. It is therefore imperative for partners to make deliberate attempts in embracing diversity where instructors and course designers should discuss and become aware of the influence that their own unique social and cultural contexts have had on their views (Crosslin, 2018). Crosslin (ibid) further argued that no matter who you are, your unique social and cultural contexts have influenced what you know, how you learned what you know, and how you want to teach what you know (p. 144). During the course provision stage, partners are encouraged to adapt to different choices to help improve the relevance of the course and the feasibility of implementing these courses. These choices will then influence the course goals and objectives and the activities that students should be engaged in and it is for this reason that Crosslin (2018; p. 86) outlined four basic steps for effective course creation and provision.

1) Determine the main power dynamic for the course (Instructivist, Constructivist, Connectivist, etc). Ask yourself “What is the main reason for the dynamic I selected?” and “What other power structures could also possibly be part of the course design?” It is okay to have mixtures of others, but thinking through that may make you reconsider the main one.
2) Determine the main methodology for the course (Pedagogy, Andragogy, Heutagogy, etc). Ask yourself “What is the main reason for the methodology I selected?” and “What other methodologies could also possibly be part of the course design?” Again, it is okay to have mixtures of methodologies, but thinking through that may make you reconsider the main one.
3) Make a list of every type of communication you think would be utilised in the course (see the previous section on “Types of Communication and Interaction”). This may be a short list (or a list of one) or a long list. Then, next to each type of communication, write out the power structure and methodology you want to use with each type. Use this list to re-evaluate numbers one and two.
4) The final step is to start listing the activities (or activity ideas) that you want in the course. Create a map of the activities you would like in the course. Then connect those with a communicative action (Normative, Strategic, Constative, Dramaturgical, etc. – see the previous section on “Clear Communication”). Connect each of those with a type of communication. Next, add the power dynamic and methodological match for each item in the list. This process may cause you to revise previous steps or even the map of activities. Finally, match your activities to your

goals/outcomes/competencies (and make sure there are no gaps), order the list, and begin plugging it into the course outline.

6.2. Online and blended provision – resources

Several guides are available for developing online and blended provision of doctoral courses of good quality. The guides linked below are all fairly new, but build on former material developed to support online and blended learning. All are OERs and can be adapted to your purposes.

The following online courses can be recommended:

Creating Online Learning Experiences (2018)
This is a brief guide to online courses, from small and private to massive and open. The purpose of the book is to provide guidance and advice for instructors who would like to develop an online course. The overall goal is to provide some clarity about many of the steps required to propose and design a course, to describe the resources needed, and to explain the roles of the stakeholders. Online courses generally take much longer to develop than most people realize. The information in this book is very important in that it is based on practical experience gleaned from those that have designed and offered successful courses.

Handbook of Open, Distance and Digital Education, ODE (2022)
The book provides a unique and comprehensive overview of ODE in the age of digital transformation in education. It offers an in-depth discussion on various issues related to ODE from historical and cross-cultural perspectives.

Improving online teaching. Practical guide for quality online education (2022)
This book, developed by the Open University of Cataluña, was published in cooperation between UOC and IAU, based, among others, on a joint webinar-series.

Optimizing High-Quality Digital Learning Experiences (2021)
This Playbook for Faculty aims to guide faculty in thinking and designing strategically to amplify the opportunities the online environment provides in both their digital spaces and physical classrooms. By integrating teaching and design principles, this guide assists faculty in positively impacting student learning, especially for students who are minorities because of race, gender, disability, or socioeconomic status.

UK Council for Graduate Education has published a guide to online supervision (2020)
The guide shares the benefits of online supervising, outlines the issues and challenges for supervisors and candidates, and suggests strategies and practices for supervisors to consider when working with candidates engaged in research at a distance.

Teaching in a Digital Age (2015 – currently in revision)
The book examines the underlying principles that guide effective teaching in an age when all of us, and in particular the students we are teaching, are using technology. A framework for making decisions about your teaching is provided, while understanding that every subject is different, and every instructor has something unique and special to bring to their teaching.

CHAPTER SEVEN

7.1. Course evaluation and improvements

The concept of quality assurance

Quality assurance and enhancement is a critical component of any world-class education process and should be done continuously during the entire lifetime of the course or programme. Such requirements help to maintain standards that act as the means to achieve control and uphold the agreed standards at the local and international levels. It does not only ensure accountability but can be used to encourage a degree of compliance with policy requirements (Harvey & Newton, 2007). To ensure that there is a constructive alignment between the learning outcomes, learning and teaching activities and assessment, students, teachers and other educators should evaluate the course co-created by partner institutions periodically. Apart from the usual course evaluation surveys that are sent to students who have taken the course to elicit their opinions about the course(s) and areas that require improvement, a course analysis should also be done to enable quality assurance.

In this chapter, the focus is on quality online and blended provision. In a broader context the following indicators are used for assessment of doctoral education:

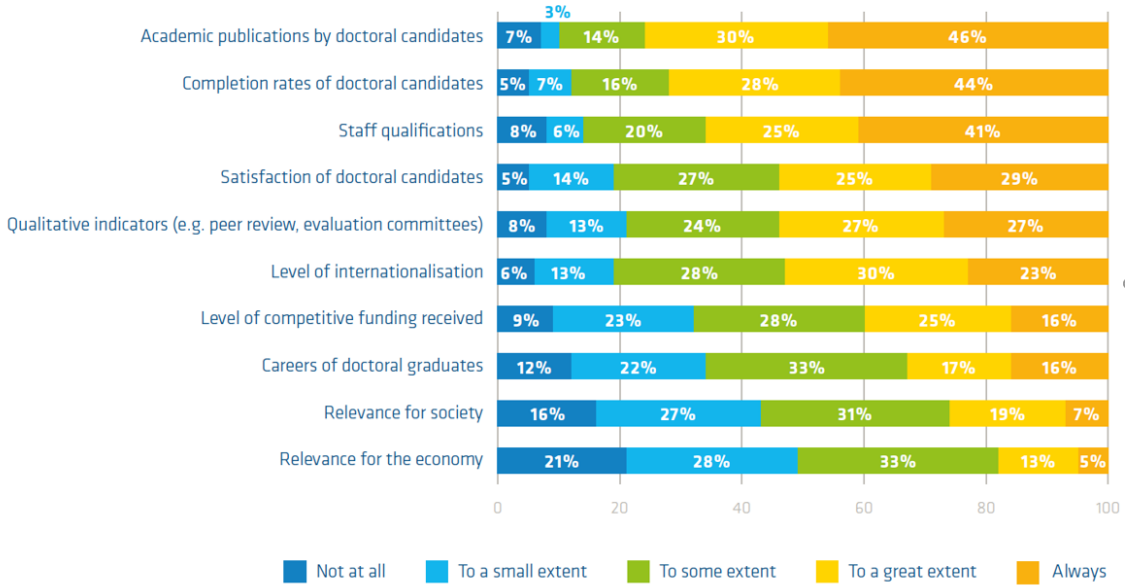

Figure 21: Indicators used for assessment: In your institution, to what extent are the following aspects/criteria used to assess/evaluate doctoral education? (EUA, 2019).

In addition to this, it is anticipated that the partner institutions have a yearly quality assurance meeting to review the course contents and align with the current trends and demands. For uniformity, partners are encouraged to adopt a reliable quality assurance instrument for evaluating the courses. We propose that the design and evaluation of the online courses follow the Dublin City University, DCU, quality checklist (2020) for designing and delivering online courses. The DCU quality checklist is digitally implemented and modified for multinational course development teams to co-create and review new courses and the following aspects of the checklist could be considered:

- Identity, Narrative and Philosophy
- Designing for Learning
- Learner Profile
- Structure
- Appearance
- Wrapping (integrated learning resources)
- Digital Media
- Currency
- Workload
- Delivery Mode

- Facilitating
- Teacher Presence
- Student Interaction
- Active Learning
- Teaching Methods
- Assessment and Feedback for Learning
- Alignment
- Variety
- Challenge
- Feedback
- Responsiveness
- Evaluating Teaching and Learning
- Evaluation, Self-Learning, Quality Enhancement, Overall Quality of Course Design, Coherence, and Engagement

7.2. Self-assessment tool for digitally enhanced learning and teaching (DELT)

The launch of the new Digital Education Action Plan (2021-2027) with the major strategic priority for the need and development of a high-performing digital education ecosystem, calls for assessment tools for evaluating or measuring the use and effectiveness of Digitally Enhanced Learning and Teaching (DELT). The use of DELT has increased across most European countries and beyond. Researched by Volungevičienė et al. (2021) pose the importance of DELT particularly in response to the Covid-19 pandemic. Although different instruments have been developed for different purposes, all have the prime objective of harnessing the potential value of the use of DELT.

Despite the importance of DELT, Volungevičienė et al. (2021; p.6) suggest that; “many challenges remain in developing and implementing strategies that harness its potential. Institutional leadership perceives the difficulty to devise a concerted approach for DELT for the entire institution as one of the top challenges, right after lacking of staff resources external funding opportunities.” They argued that given the increased interest in DELT for blended and hybrid learning, which has become part of our current teaching and learning process, institutions must review the digitalization policies to ensure that they are fit for purpose.

Different self-assessment tools (i.e. DigCompOrg framework, ACODE Benchmarks, UNESCO Blended Learning Self-Assessment Tool, etc.) have been designed and evaluated by different organizations and institutions and available for use. However, it is important to have a standardized and agreed tool that could be used to evaluate the course effectively. To have an overview, please see the figure below and for details look at the publication Developing a high performance digital education ecosystem (EUA 2021).

Table 5: 20 instruments from around the globe designed for self-assessment of digitally enhanced learning and teaching (DELT) at higher education institutions.

Tool only	Framework only	Combination of tool and framework
SELFIE	DigCompOrg	DigCompEdu
Leibniz Benchmarking Tool	JISC- Digitally Capable Organisation	JISC (tools available on project website as a commercial service)
HEInnovate	QQI Blended Learning Guidelines	UNESCO Blended Learning Assessment Tool
	European Maturity Model for Blended Education (EMBED)	E-xcellence: Quality Assessment for E-learning: a Benchmarking Approach
	ENQA: Quality Assurance of E-learning Provision	OLC Quality Scorecard Suite
	National Quality Standards for Online Education (NSQ)	Technology Enhanced Learning Accreditation Standards (TELAS)
	3E Framework	ACODE TEL Benchmarks
		Quality Matters (tool is fee-paying but there is an accessible version of the framework)
		Commonwealth of Learning (CoL) Benchmarking Toolkit for Technology-Enabled Learning
		HolonIQ Digital Capability Framework

ONLINE LEARNING ENVIRONMENT DESIGN

PERFORMANCE CRITERIA	SUCCESS INDICATORS	MEASURE OF PERFORMANCE			
STANDARD 1: The online learning environment design supports a positive learner experience.					
1.1. The online learning environment is inclusive.	1.1.1. Language used is consistently appropriate and inclusive (including consistent tone, voice, person).	Yes	Yes But	No But	No
	1.1.2. The online learning environment contains evidence that diverse perspectives are respected.	Yes	Yes But	No But	No
	OVERALL	Yes	Yes But	No But	No
1.2. The online learning environment functions across devices and platforms.	1.2.1. The online learning environment is responsive across different contemporary devices (e.g. screen size adjusting automatically).	Yes	Yes But	No But	No
	1.2.2. The online learning environment and integrated technology are compatible across multiple plat forms and operating systems.	Yes	Yes But	No But	No
	1.2.3. The online learning environment and integrated technology are compatible with contemporary browsers.	Yes	Yes But	No But	No
	OVERALL	Yes	Yes But	No But	No
1.3. Online learning environment meets appropriate accessibility standards.	1.3.1. Site, content and activities meet a contemporary set of accessibility standards/guidelines (e.g. accessible font, contrasting colour).	Yes	Yes But	No But	No
	1.3.2. External tools and applications adhere to accessibility standards (e.g. Turnitin, VoiceThread, Echo360, SPSS, Padlet).	Yes	Yes But	No But	No
	1.3.3. Files are appropriately optimised for screen readers, consistently named, then labelled by type and size.	Yes	Yes But	No But	No
	1.3.4. Alternate formats are made available for multimedia (e.g. images and alternate texts, subtitling for video or audio, transcripts for video and audio).	Yes	Yes But	No But	No
	OVERALL	Yes	Yes But	No But	No
1.4. Learners have opportunities to provide feedback.	1.4.1. Learners have opportunities to provide immediate feedback (e.g. thumbs up/down, stars, flagging).	Yes	Yes But	No But	No
	1.4.2. Learners have opportunities to provide feedback at different points in time (e.g. surveys, polls, signposting).	Yes	Yes But	No But	No
	1.4.3. Learners are informed about how their feedback is going to be collected and used.	Yes	Yes But	No But	No
	OVERALL	Yes	Yes But	No But	No

Figure 22: Example of TELAS framework

7.3. Endnote and acknowledgements

We are grateful for the time taken by the reader to seek inspiration and guidance from this handbook, and we hope it has been helpful, at least some parts of it. As the project ends, this version of the handbook may be considered the final product.

We would especially like to acknowledge and thank the work done by reviewers, who have taken time to read and send us valuable feedback: Love Ekenberg, in mem. (Stockholm University), Alina-Adriana Minea (Gheorghe Asachi Technical University of Iasi), Pedro A Garcia-Sanchez (University of Granada), Raphael Nyonjie (University of Nairobi).

Appendix I: Checklist

This checklist has been built as an additional toolkit for institutions embarking on co-creation and sharing of courses at the tertiary level in higher education. All bullet points start with the initial thought – *Have you consider…?*

CHAPTER ONE – Introduction

- why a co-creation and sharing of a course initiative matters?
- the complexity involved in co-creation and sharing processes?
- your institution's capacity and capability for providing online courses?
- verifying if your institution has a strategy for digitalisation?

CHAPTER TWO – Regulatory frameworks and partners agreement

- the contextual characteristics of the institutions involved in the co-creation?
- the regulatory systems shaping each institution? (i.e. cross-country, national, institutional regulations)
- the model to be used in the co-creation and sharing processes?
- how the course will be awarded and recognised by all partners? (i.e. credits, badges, certificates)

CHAPTER THREE – Finding partners, setting the scene, agree on ambitions and goals

- which partnership to build and why?
- the differences in institutional goals and ambitions?
- how the needs analysis will be conducted in each institution?
- how discrepancies in the SWOT analysis will be identified and addressed?

CHAPTER FOUR – Course co-creation

- the operational extent (those who must be involved in the process and why) and degree of co-creating a course?
- how OER principles can be applied in the initiative?
- which elements are the core components and a starting point for the co-creation process?
- what resources are already available as open source?

CHAPTER FIVE – Course sharing for online and blended provision

- which stakeholders should be included in the sharing model?
- the platform(s) that will be used for course sharing and who will be responsible for coordinating it/them?
- the tools necessary for course sharing?
- how the sharing will be sustained?

CHAPTER SIX – Course provision

- which design methodology should be applied to ensure the necessary elements are in place?
- which pedagogical approach(es) is most suitable for the context and what kind of the learning environment will be provided?
- what types of interactions (activities, discussions) the participants will have within the course, and how these will be communicated?
- the differences in academic calendars of the partners involved?

CHAPTER SEVEN – Course evaluation and improvements

- who will be responsible for assessment and evaluation of the course?

- how feedback from the various stakeholders will be received?
- how quality will be enhanced and assured in a sustainable way?
- who will be responsible for developing the course further based on feedback?

Appendix II: Glossaries relevant for this handbook

For definitions related to this handbook, several glossaries are relevant and the recommended links are below:

The Erasmus+ Programme Guide Part D – Glossary of terms:
https://erasmus-plus.ec.europa.eu/programme-guide/part-d

The European Credit Transfer and Accumulation System (ECTS), page 65 – 77:
https://op.europa.eu/en/publication-detail/-/publication/da7467e6-8450-11e5-b8b7-01aa75ed71a1

Joint programmes and joint, multiple, double, dual degrees, page 45 - 48:
https://op.europa.eu/en/publication-detail/-/publication/6e06043f-2f96-11eb-b27b-01aa75ed71a1/language-en

Concepts and definitions on qualifications and qualifications frameworks:
https://www.etf.europa.eu/sites/default/files/2021-06/acqf_thematic_brief_1_concepts_and_definitions_web.pdf

Online and blended learning:
https://onlinelearningconsortium.org/updated-e-learning-definitions-2/

http://www.fpsk6.org/fps/_zumu_user_doc_cache/Glossary.pdf

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Appendix IV: Cases

The NORSI case

NORSI is a Nordic network co-creating and sharing courses, partly online and blended and across the Nordic countries. Below the NORSI case is described.

NORSI is the Nordic research school for PhD students in the Nordic countries within the research fields of innovation and entrepreneurship. Doctoral students within innovation and entrepreneurial studies enrol to take academic courses offered by NORSI and its partner institutions. NORSI is also an active network in the innovation and entrepreneurship research communities.
NORSI is funded by all partner institutions and is also granted funding until 2024 from the Norwegian Research Council and the Kamprad Family Foundation for Entrepreneurship, Research & Charity.

NORSI Core Courses Policy

Core and partner courses: NORSI offers both core and partner courses. NORSI organizes the core courses, while the partner courses are recommended by NORSI but fully organized by one of the NORSI partners that will only receive partial support.

Focus on co-creating of courses and course portfolio: The NORSI course portfolio was developed with involvement of all partners through workshops and online discussions. All core courses have been developed through the involvement of several NORSI partners and are still evolving, based on experience with running courses and feedback from our students. The course content, specialization, research focus and perspective emerge as part of the course development discussions.

NORSI core course criteria – for initiatives and funding

- Collaboration – several NORSI partners -minimum 3;
- One NORSI partner is course host;
- Partner institutions should be from different countries;
- Course gives 7,5 ECTS (usually), and are graded pass/fail;
- Course is registered and part of the host university portfolio – important for student transcripts and anchoring.

NORSI course format

- Alterative 1: 1 week physical;
- Alternative 2: Hybrid – 2/3 days digital and 2/3 days physical;
- Focus on network-building.

NORSI pedagogy – what makes a NORSI course

- Students use their own research – strong involvement of the PhD candidates in the course;
- Students use their own research in the course papers;
- Direct feed-back to students;
- NORSI teaching methods;
- Autonomy;
- Opportunities for dialogue with faculty;
- Perspectives from involved faculty and students from various institutions in the Nordic countries.

NORSI course content

- Develop a course involving partners with quality research within a particular area and that are experts in a field;
- Show the classic and newest research within the research area;
- Create a conversation of the main topics within a particular research area;
- Invite in world-class international experts;

The NORDOC case

NORDIC DOCTORAL TRAINING IN HEALTH SCIENCES
Mission Statement of NorDoc - Nordic Doctoral Training in Health Sciences

At a meeting in Helsinki on 28 September 2016, representatives of the seven doctoral schools/ faculties of health sciences, Aarhus University, the University of Bergen, the University of Copenhagen, the University of Gothenburg, the University of Helsinki, the University of Iceland and Karolinska Institutet, decided to establish a Nordic network of doctoral education in health sciences. It is the intention of the seven founding members to invite all doctoral schools/faculties of health sciences in the Nordic countries to participate in the network and contribute to its activities.

Name
The name of the Nordic network will be NorDoc - Nordic Doctoral Training in Health Sciences.

Membership
All Nordic doctoral schools/faculties of health sciences who accept this mission statement are invited to be members of NorDoc.

Target audience and aim
The activities of NorDoc aim to initiate, facilitate and intensify collaboration among the Nordic doctoral schools/faculties in all relevant fields for the benefit of Nordic doctoral candidates and their supervisors, in order to support and ensure the highest possible quality in doctoral education in health sciences.

Furthermore, it is the aim of the network to initiate and facilitate relevant joint actions of the Nordic doctoral schools, specifically in terms of:

- removing barriers to cross-border collaboration between doctoral schools in the Nordic countries;
- acknowledgement of Nordic doctoral education;
- providing Nordic doctoral candidates free access to current research courses offered by the members of the network;
- exploiting common existing resources and capacities for the benefit of arranging doctoral courses in all relevant fields of research at the highest possible scientific level;
- attracting international scientific resources and capacities for such activities;
- promoting and encouraging mobility of doctoral candidates and researchers in and between the Nordic countries;
- arranging conferences, seminars etc. on topics of common interest;
- providing international (e.g. Nordic and European) funding for common research projects and other relevant joint activities as e.g. those mentioned above;
- providing policymakers in Nordic countries and international organisations (e.g. the European Union) with information on matters concerning doctoral education in health sciences;
- expanding knowledge of and understanding for doctoral education in the Nordic countries;
- detecting and sharing best practices.

European University of the Seas

The vison of European University of the Seas, (SEA-EU), is to establish a distinctly international, pluri-ethnic, multilingual and interdisciplinary European University. They state: “The vision is rooted in the high quality and excellence in education and research of the alliance with the intent to strengthen the links between teaching, research, innovation and knowledge transfer. The convergence of media and digitalisation has changed the way we work and live. Change, going forward, will continue to be rapid, in a world of perpetual connectivity. Consequently, traditional training models are being

found wanting. Developing both critical-thinking and creativity with students is key. This is our vision as a consortium: to create the conditions in which a student will be able to freely and confidently move between disciplines, languages, countries, sectors. Seamless mobility across borders and academic disciplines will provide a substantial leap in quality, performance, attractiveness and international competitiveness. We will work to make our university alliance a universe of possibilities, in which each student will be free but guided to seek out and develop their own path."

The **SEA-EU Joint PhD Courses** is an activity based on the principle of reciprocity: Each SEA-EU partner university offers **PhD courses** to doctoral candidates from other partner universities. Each partner opens its existing transversal (and/or scientific) courses targeted to PhD-Candidates for the alliance (reserving a few places for SEA-EU members) or even creates new courses for the alliance. During the first funding phase (until September 2022) the offer is available for **doctoral candidates in the interdisciplinary marine sciences**. We are hoping to extent the offer to all doctoral candidates in the next funding period.
We strengthen our alliance by coordinating and maintaining an up-to-date list of joint PhD courses. Thereby, **SEA-EU doctoral candidates** can access all the information needed for enrolment into these online courses here centrally.
The platform/list is updated regularly as new courses become available.
We are looking forward to your applications!
Conditions of enrolment:

- The course offers are meant for **SEA-EU Alliance Universities' doctoral candidates**: Registration is only considered if made with a valid institutional email address;
- By applying to any of the courses you agree that your data (name, affiliation, email) will be passed on to the course instructor and the corresponding universities' entity in case your application is confirmed;
- A certificate of participation will be issued, upon attendance to >75% of the course;
- Registration is binding.

The Pan African University

This text is from the PAU Scholarships application platform.
The Pan African University is an initiative of the Heads of State and Government of the African Union. It is a premier continental university network whose mission is to provide quality postgraduate education geared towards the achievement of a prosperous, integrated and peaceful Africa.
Young, qualified, talented and enterprising applicants from African countries and the Diaspora are invited to apply to join Masters or PhD degree programmes at any of the following four PAU institutes listed below. Youths with potential, motivation and who desire to play transformative leadership roles as academics, professionals, industrialists, innovators and entrepreneurs are particularly encouraged to apply.

1. Pan African University Institute for Basic Sciences, Technology and Innovation (PAUSTI), at the Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.	2. Pan African University Institute for Life and Earth Sciences-including Health and Agriculture (PAULESI), at the University of Ibadan (UI), Nigeria.	3. Pan African University Institute for Governance, Humanities and Social Sciences (PAUGHSS), at the University of Yaounde IIand the University of Buea, Cameroon.	4. Pan African University Institute for Water and Energy Sciences - including Climate Change (PAUWES), at the University of Tlemcen, Algeria.

The list of the institutes with the related programs:

1) Pan African University Institute for Basic Sciences, Technology and Innovation (PAUSTI), at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.

Masters (MSc)

- MSc. Civil Engineering (Construction and Management Option)
- MSc. Civil Engineering (Structural option)
- MSc. Civil Engineering (Transportation option)
- MSc. Electrical Engineering (Computer Engineering option)
- MSc. Electrical Engineering (Telecommunications option)
- MSc. Mathematics (Data science)
- MSc. Mathematics (Statistics option)
- MSc. Mechanical Engineering
- MSc. Mechatronic Engineering
- MSc. Molecular Biology & Biotechnology

PhD

- PhD Civil Engineering (Structural option)
- PhD Electrical Engineering (Power Systems option)
- PhD Electrical Engineering (Telecommunications option)
- PhD Mathematics (Computational option)
- PhD. Mathematics (Statistics option)
- PhD Molecular Biology & Biotechnology

2) Pan African University Institute for Life and Earth Sciences- including Health and Agriculture (PAULESI), at the University of Ibadan (UI), Nigeria.

Masters (MSc)

- MSc. Avian Medicine
- MSc. Environmental Management
- MSc. Geosciences (Mineral Exploration option)
- MSc. Geosciences (Petroleum Geosciences option)
- MSc. Health Sciences (Reproductive Health option)
- MSc. Medicinal Plant Research and Drug Development
- MSc. Plant Breeding
- MSc. Sports Management and Policy Development
- MSc. Veterinary Vaccine production & Quality Control option

PhD

- PhD Environmental Management
- PhD Geosciences (Mineral Exploration option)
- PhD Geosciences (Petroleum Geosciences option)
- PhD Health Sciences (Reproductive Health option)
- PhD Plant Breeding

3) Pan African University Institute for Governance, Humanities and Social Sciences (PAUGHSS), at the University of Yaounde II and the University of Buea, Cameroon.

Masters (MA)

- MA. Conference Interpreting
- MA. Governance and Regional Integration
- MA. Transborder languages and Intercultural Communication
- MA. Translation

PhD

- PhD Governance and Regional Integration

4) Pan African University Institute for Water and Energy Sciences -including climate change (PAUWES), at the University of Tlemcen, Algeria.

Masters (MSc)

- MSc. Climate Change (Engineering option)
- MSc. Climate Change (Policy option)
- MSc. Energy (Engineering option)
- MSc. Energy (Policy option)
- MSc. Water (Engineering option)
- MSc. Water (Policy option)

There is as well information on an e-learning opportunity, but no courses are specified.

Appendix V: Open repositories and search tools

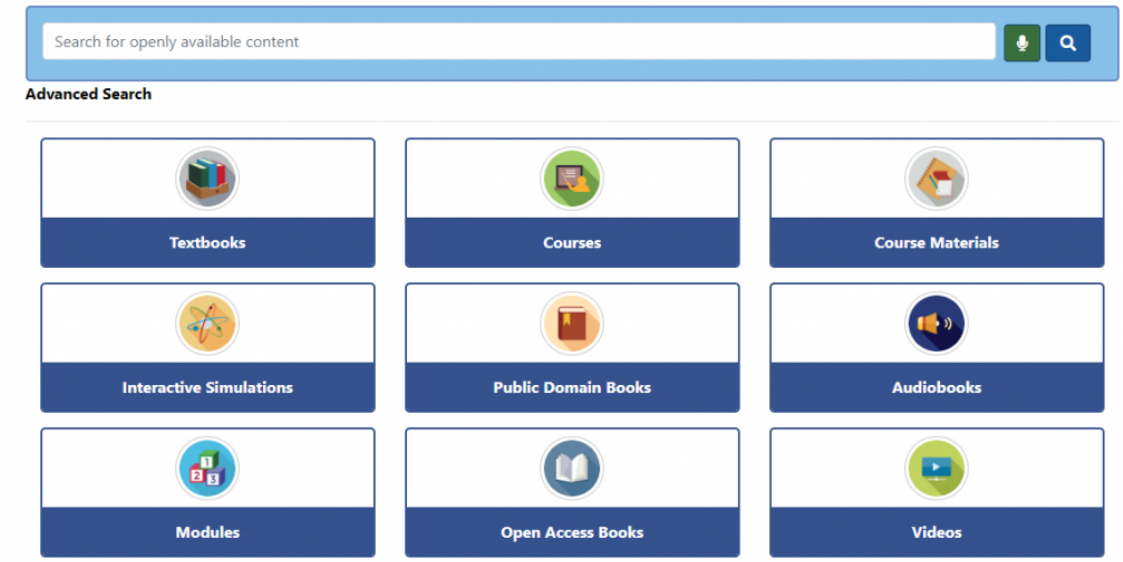
Adapted from The OER Starter Kit

BEST BETS

When starting your search for OER, it's best to begin in a place with a wide variety of options. The websites listed below each have a different focus, but they are good places to start if you aren't sure what to look for.

- The Open Textbook Library is a great resource for finding open textbooks. If you want a textbook and nothing more, this is the place to start.
- BCCampus Open Textbooks collects resources created, reviewed, or adopted by instructors at British Columbia universities. Materials can be filtered by Accessibility as well as whether they have been adopted by BCCampus courses, include ancillary materials, or have been reviewed by faculty.
- Curated lists of OER, like the Iowa State University Library Guide to OER, can be useful for exploring a selection of open content in your subject area.

FEDERATED SEARCH TOOLS



SUNY's Openly Available Sources Integrated Search (OASIS)

OASIS is a search tool that aims to make the discovery of open content easier by searching multiple sources for OER and other open content at once. OASIS currently searches for open content from 79 different sources and contains approximately 330,000 records.

George Mason OER Metafinder

The Mason OER Metafinder (MOM) links to a wide array of open content, including open access books and articles, documents in the public domain, and OER. Because of its large breadth of resources, we recommend that you start your MOM search with only a selection of the "OER-specific sites" checked, rather than all the materials it can include.

MERLOT

MERLOT is a project that was started in 1997 by the California State University system. The repository includes thousands of resources contributed by members, including original content and links to resources found through other platforms.

INSTITUTIONAL COLLECTIONS

Institutional repositories (IRs) are not just for sharing copies of research articles and student theses. They can also be used to store and share OER. Although not every college shares OER through their institutional repository, the colleges below do share collections of OER specific to their institution:

- Galileo Open Learning Materials (Georgia higher education institutions)
- OpenMichigan (University of Michigan)
- MIT OpenCourseWare (Massachusetts Institute of Technology)

SUBJECT-SPECIFIC REPOSITORIES

Some open educational resources are shared through subject-specific repositories. A few notable examples of this type, including open publishers that specialize in one discipline, are listed below:

- Chem Collective: *Chemistry*
- Learn Chem E: *Chemical Engineering*
- Noba Project Psychology Modules: *Psychology*
- Center for Open Educational Resources and Language Learning (COERLL): *Languages*
- Open Geography Education: *Geography*
- Engineering Technology Simulations: *Engineering, Physics*
- PhET Simulations: *Physics, Physical science, Geology, Chemistry*
- SkillsCommons: *Career & Technical Education (CTE)*
- Green Tea Press Textbooks: *Computer Science, Programming* (Bayes, Python, MATLAB, Java, DSP)

OER BY COURSE

Some colleges choose to share information about which OER their instructors assign in courses. These lists can give you a good idea of what other instructors in your discipline have adopted and (if they have provided a review), what they think of their adopted resource.

- COOL4ED Faculty Showcase (California universities and colleges)
- Open Oregon Educational Resources (Oregon universities and colleges)
- OPEN NYS Faculty Assessments (New York State universities)

OPEN CONTENT (NOT EXPLICITLY OER)

Not all open content is made to be used in the classroom, but that does not mean you cannot integrate them into your course. Open access book chapters and openly licensed media can be great additions to your course.

Open Access Publishers and Repositories

- Directory of Open Access Journals (DOAJ): Open Access journal articles
- Directory of Open Access Books (DOAB): Open Access books
- Project Gutenberg: Public domain books and documents
- PubMed: Open access journal articles
- Public Library of Science (PLoS): Open access journal publisher
- Open Book Publishers: Open access book publisher

CC-licensed Media

- CC Search: A federated search tool for finding content available under a CC license
- Digital Public Library of America: Public domain images, videos, recordings, and texts
- The Metropolitan Museum of Art: High-quality open images from the Met
- Pexels: Public domain and CC-licensed photographs and stock images
- Unsplash: Public domain and CC-licensed photographs and stock images
- Wikimedia Commons: Public domain and CC-licensed images and figures
- Google Image Search: Images. Use the Tools/Usage rights button to filter by license
- Youtube: Videos. Use the Advanced Search/CC license option to see open content
- Free Music Archive: Public domain and CC-licensed music and sound bites

Appendix VI: Online course design elements

OCDE categories and items (Martin et al., 2021)

Overview

1. A student orientation (e.g., video overview of course elements)
2. Major course goals
3. Expectations regarding the quality of students' communication (e.g., netiquette)
4. Expectations regarding student participation (e.g., timing, frequency)
5. Expectations about the quality of students' assignments (e.g., good examples)
6. The instructor's contact information
7. The instructor's availability for office hours
8. A biography of the instructor
9. The instructor's response time to e-mails and/or phone calls
10. The instructor's turnaround time on feedback to submitted assignments
11. Policies about general expectations of students (e.g., late assignments, academic honesty)

Content presentation

12. A variety of instructional materials (e.g., textbook readings, video-recorded lectures, web resources)
13. Accommodations for learners with disabilities (e.g., transcripts, closed captioning)
14. Course information that is chunked into modules or units
15. Clearly written instructions
16. Course activities that promote achievement of objectives
17. Course objectives that are clearly defined (e.g., measurable)

Interaction and communication

18. Opportunities for students to interact with the instructor
19. Required student-to-student interaction (e.g., graded activities)
20. Frequently occurring student-to-student interactions (e.g., weekly)
21. Activities that are used to build community (e.g., icebreaker activities, introduction activities)
22. Collaborative activities that support student learning (e.g., small group assignments)
23. Technology that is used to promote learner engagement (e.g., synchronous tools, discussion forums)
24. Technologies that facilitate active learning (e.g., student-created artefacts)

Assessment and evaluation

25. Assessments that align with learning objectives
26. Formative assessments to provide feedback on learner progress (e.g., discussions, practice activities)
27. Summative assessments to measure student learning (e.g., final exam, final project)
28. Assessments occurring throughout the course
29. Rubrics for graded assignments
30. Self-assessment options for learners (e.g., self-check quizzes)
31. Opportunity for learners to give feedback on course improvement

Learner support

32. Easy course navigation (e.g., menus)
33. Consistent course structure (e.g., design, look)
34. Easily viewable media (e.g., streamed videos, optimized graphics)
35. Media files accessible on different platforms and devices (e.g., tablets, smartphones)
36. Minimum technology requirements (e.g., operating systems)
37. Resources for accessing technology (e.g., guides, tutorials)
38. Links to institutional support services (e.g., help desk, library, tutors)