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Institute for Integrated Management
of Material Fluxes and of Resources

Capacity Building for Nexus Implementation: Technical Report

Lessons Learned from UNU-FLORES Online
Courses hosted on the Blended Learning
Platform of the Nexus Observatory

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List of Abbreviations and Acronyms

CDG Unit	Capacity Development and Governance Unit
ECTS	European Credit Transfer System
IOER	Leibniz Institute of Ecological Urban and Regional Development
TU Dresden	Technische Universität Dresden
UNU	United Nations University
UNU-FLORES	United Nations University Institute for Integrated Management of Material Fluxes and of Resources

Preface

The Nexus Observatory is a flagship initiative of the United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) that strives to bridge the science-policy divide. The science-policy divide is at the heart of the disconnect between scientific research output and the apparently ad hoc nature of decision-making. We have argued in *Governing the Nexus* (Springer, 2015) that the science-policy divide in environmental governance is apparent in five distinct forms: (a) a focus on infrastructure versus services; (b) centralised versus decentralised planning and governance; (c) public versus private management models; (d) short-term versus long-term planning perspectives and (e) efficiency versus equity goals. The persistence of this divide in environmental governance results in fragmented decision-making, which in turn leads to an inability on the part of decision makers to respond effectively to environmental risks, such as droughts or floods, that could have devastating impacts on human well-being and livelihood security. The Nexus Observatory is driven by the desire to enable governments at national and regional levels to better understand the causes of the science-policy divide and provide them with necessary tools that support integrated management of environmental resources, services and associated risks.

The Nexus Observatory is premised on the idea that an improved “evidence base” will help bridge the gap between science and policy. One of the prerequisites for evidence-based decision-making is access to disaggregated, reliable, and frequent information at appropriate scales on the incidence and quantum of environmental risks and the potential impact on human well-being and livelihood security. Furthermore, poor feedback loops between those who collect and analyse data and those who have to make critical decisions with regard to the allocation of financial and human resources may make it challenging to respond effectively to environmental risks. The Nexus Observatory advances the think tank function of the United Nations University (UNU) by seeking to establish seamless links between research, teaching, and policy advocacy to effectively address the science-policy divide in environmental governance. The online medium offers an opportunity to quickly respond to the ever-changing demands of nexus practitioners. Nexus practitioners include decision makers and scholars who are confronted with challenges of sustainable development, the resolution of which in many instances necessitates addressing trade-offs and the rebound effects of development interventions.

The teaching component of the Nexus Observatory is supported by the blended learning function. The blended learning function is advanced by an online platform (Moodle) and content (curriculum, teaching material, and videos). The first Advisory Committee meeting of UNU-FLORES pointed to some of the pitfalls of already existing online courses that included issues of quality, lack of a research focus and high investment of staff time in delivering courses and responding to the queries of course participants. The first round of online courses, developed as part of the blended learning function of the Nexus Observatory, took serious note of the advice offered by the Advisory Committee and focused on testing the technical and didactic features of the blended learning function of the Observatory. This report highlights lessons learnt with regard to the design and delivery of online courses, and offers specific recommendations on how the links to research and policy advocacy may be strengthened in the future.

To respond to the guidance of the Advisory Committee, the utmost care was taken to develop curricula based on state-of-the-art research undertaken by leading experts covering nexus-relevant topics of life cycle costs, multiple-use water services, and intergovernmental fiscal relations. The curricula were peer reviewed and published successfully as SpringerBriefs. With regard to delivery of the online courses themselves, we introduced several important innovations to increase the policy-relevance of courses and reduce the teaching load of UNU-FLORES staff. First, we experimented with the use of *portfolios* as a form of course assessment. Second, we developed effective partnerships with German partners in Saxony – Technische Universität Dresden (TU Dresden) and Leibniz Institute of Ecological Urban and Regional Development (IOER) – to deliver the actual course lectures and respond to student queries every week during the three months during which the courses ran. These innovations offer us lessons that can help us to strengthen the links between the Blended Learning Platform (Window 2)¹ of the Nexus Observatory and Windows 1, 3, and 4 of the Nexus Observatory, and to enhance the capacity of the mechanism to bridge the science-policy divide.

This report summarises key features of the Nexus Observatory online courses and highlights lessons learnt. One recommendation we make in this report is that accreditation of online courses by TU Dresden could support stronger links between UNU-FLORES's teaching and research programmes. Periodic reviews of the quality of online courses would be necessary to ensure the continued extension of accreditation by TU Dresden. This process could ensure an element of quality control over UNU-FLORES's research and teaching activities.

Besides serving as institutional memory for the institute we hope this report can lead to several follow-up initiatives, which could include:

- Proposals for research and capacity development involving partners worldwide.
- Seminar/webinar series on accreditation of online courses that complement PhD-level research programmes.
- A working paper on the use of portfolios and comparative benefits vis-à-vis conventional assessment practices.

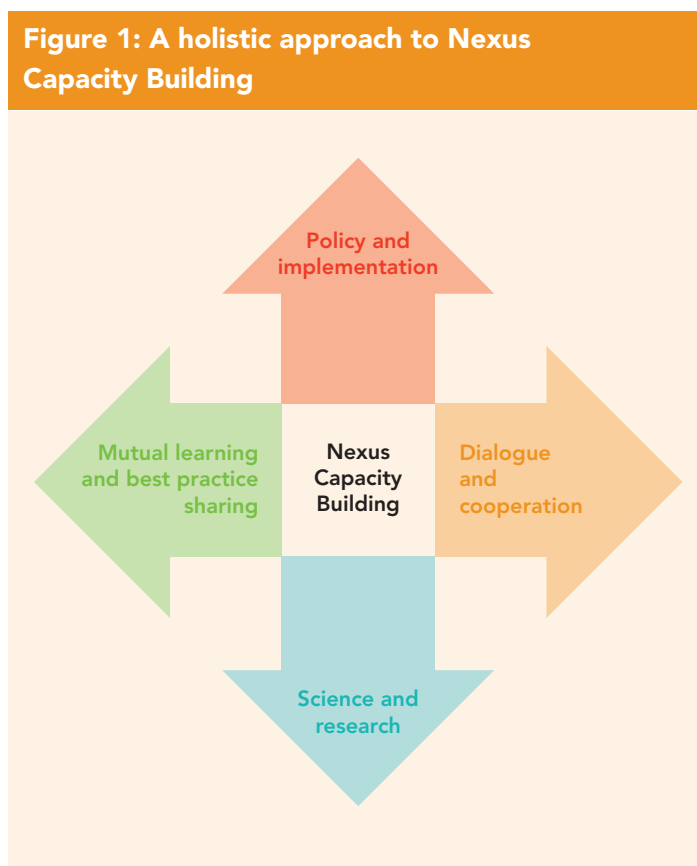
Mathew Kurian

Head of Capacity Development and
Governance Unit and Project Manager
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¹ The Nexus Observatory is made up of four seamlessly interlinked windows that advance the goals of cross-fertilisation, piloting, capacity development, dissemination of insights and policy advocacy, and impact, monitoring and evaluation. See also: https://i.unu.edu/media/flores.unu.edu-en/attachment/4460/UNU-FLORES_NexOb_Flyer.pdf

I. Introduction to Nexus Capacity Building at UNU-FLORES

Capacity building, and sustainable development education more broadly, are cornerstones of operationalising approaches and methods that advance the sustainable management of environmental resources. Without the knowledge, competence and skills to apply and implement strategies, programmes and projects in concrete terms, policies and management plans – or even available technologies and tools – will not deliver the positive results intended. Capacity building measures and the inherent participation of key stakeholders are often deferred to an afterthought, and thus frequently prevent the achievement of the benefits – economically, socially and environmentally – that options grounded in good science can provide (for example, equipment, software and other tools to measure water or soil quality are readily available, but key stakeholders do not know how to use them).



There is a disconnect between what science has to offer and what gets implemented in practice. These challenges are exacerbated when more interconnected resources and sectors are at stake, as the multiplicity of factors and dimensions requires decision makers, practitioners and scientists alike to be more reflexive and to consider perspectives outside their own area of expertise, evaluate diverging interests, and understand complex systems. A capacity building programme that is designed in an integrated manner and realises the multidimensional nature of such activities (for example, two-way dialogue, science-policy interactions etc.) does not only enable a step-by-step learning experience (for all involved), but more importantly provides a platform for dialogue, cooperation, best practice sharing (especially between diverse disciplines and actors), and facilitation of evidence-based decision-making that responds to the demands of sustainable development.

These additional benefits have been analysed closely during the design and development of the UNU-FLORES e-learning programme, which, as will be explained in subsequent sections, has been constructed in a holistic fashion. Thus, capacity building becomes a fluid part of achieving sustainable resource management.

Utilising the Nexus Approach for Capacity Building in Relation to Complex Real-World Problems

Since the 1980s, the nexus concept has gained prominence in the field of resource management, promoting holistic approaches that examine synergies and trade-offs. Although there is substantial scholarship covering theoretical aspects of the Nexus Approach, practical implementation remains limited. Nexus governance and policy planning approaches have only recently started to receive greater attention. These governance and policy approaches strongly relate to operationalising the Nexus Approach, as well as the role and capabilities of institutions as well as individual actors and stakeholder groups.

Additionally, capacity gaps have not been addressed sufficiently, in particular as they affect the development of competences that allow individuals to understand different sectoral and disciplinary perspectives, and to manage the complexities of real-world problems.

The question of how to build nexus competences and advance knowledge on how to apply nexus concepts and methods in practice inspired an innovative approach to the development of an e-learning programme as part of the Nexus Observatory initiative at UNU-FLORES. The programme aims to prepare participants to apply a more holistic perspective to the management of limited environmental resources, decision-making and planning – as well as in relation to financial matters. The medium of online learning was chosen as it has the potential to reach a broader audience, allows participants to learn at their own pace in a semi-structured course, and can form part of blended learning training programmes with the possibility of accreditation.

Between March and May 2015, the first round of three online courses was delivered by UNU-FLORES, followed by a second round between September and December 2016. These initial experiences with such an e-learning programme are a first step towards consolidating and disseminating nexus knowledge and nexus methodologies that contribute to the development of nexus competences of decision makers, practitioners and researchers interested in the planning and management of environmental resources. Particular consideration was given to ensuring the timeliness and relevance of the course topics, which were the result of regional consultations (see Section II). Relevance in this context refers to addressing skills and capacity gaps – especially in developing countries and emerging economies – and nexus-related sustainable development problems and themes that have been identified as policy priorities. Such a needs-based approach has proven valuable in connecting the theoretical concepts of the Nexus Approach with real-world cases, problems and applications, and above all capacity building demands.

The e-learning programme contributes to both scientific advancement and practical application.

“The course was very useful and beyond my expectations. The lectures were very useful and provided new viewpoints on water supply problems.”

2015 course participant

Since capacity building is only one part of operationalising the nexus and therefore achieving practical application of the Nexus Approach, the e-learning programme forms a part of the UNU-FLORES flagship initiative called the Nexus Observatory.² In this manner, online courses play an important role in connecting scientific research and discourse with policy- and decision-making. Not only do they offer a way of disseminating and transferring knowledge, as well as a means of widely accessible training, they also contribute to UNU-FLORES’s research activities – through the development of curricula based on regional

consultations, engagement with partners and PhD candidates to deliver online courses and serve as tutors, two-way conversations with online course participants, and an analysis of online course portfolios. By taking advantage of the collective knowledge and experiences of tutors, online course participants and UNU-FLORES staff, it is possible to recognise gaps in data, knowledge and capacity. This contributes to the identification of policy-relevant research questions, which in turn may contribute to building networks, best practice sharing, project proposals or PhD theses. Viewed holistically, the e-learning programme thus contributes to both scientific advancement and practical application.

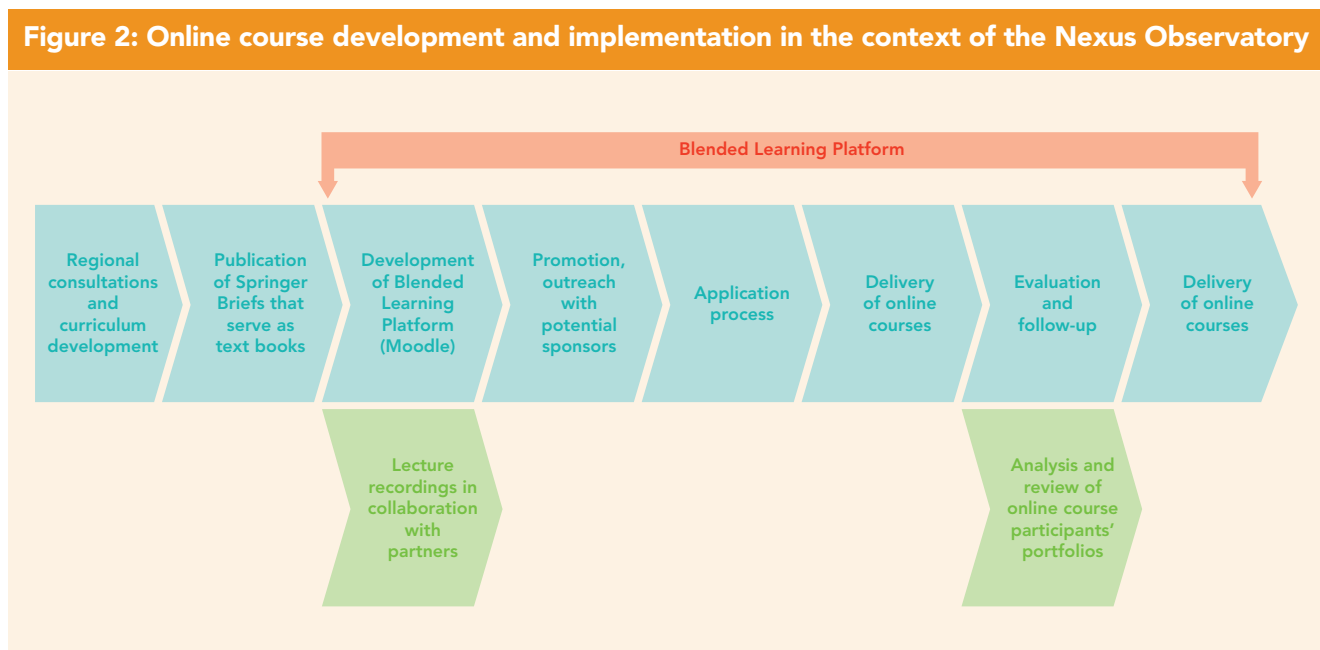
² See the Nexus Observatory flyer here: https://i.unu.edu/media/flores.unu.edu-en/attachment/4460/UNU-FLORES_NexOb_Flyer.pdf

Additionally, online courses could be integrated into the existing PhD programme jointly carried out by UNU-FLORES and TU Dresden, as well as summer schools, training of trainers or tailored modules, allowing for a truly blended learning experience. This could potentially lead to formal accreditation, which would be testimony to the value and quality of this type of nexus competency building.

Structure and Purpose of this Technical Report

The main aim of this technical report is to illustrate that traditional modes of e-learning, in particular those based on passive learning using multiple-choice questions, are designed too narrowly and often do not achieve their intended objectives. A novel approach to capacity building will be presented that draws on innovations in integrating e-learning within the broader framework of advancing sustainable development. The report will cover the design and delivery of nexus competency building and training, as well as key aspects that contributed to the online courses’ success drawn from feedback provided by early participants and the tutors involved. A number of the overall themes mentioned here are elaborated in more detail, highlighting departures from established e-learning programmes in the field of environmental resources management and sustainable development.

Figure 2 provides a general overview of the steps involved in setting up and delivering the UNU-FLORES e-learning programme. Subsequent sections will draw on the experiences gained in the process and offer insights into the broader strategy of blended learning in relation to: the Nexus Observatory and the science-policy interface; the relationship between online courses, nexus research and nexus competences; innovations as they relate to the design, didactics and delivery of online courses; and recommendations for future nexus capacity building activities. While serving as a general review of UNU-FLORES’ approach towards nexus capacity building and implementation of the e-learning programme, this report also emphasises important opportunities and limits of online learning.



II. Operationalising the Nexus and Building Nexus Capacity

The 2011 Bonn Nexus Conference was a major success in generating buy-in for the Nexus Approach. Since then, debates on the topic have disproportionately taken place in the realm of science, with only very little attention paid to the effects of politics, governance and socio-economics on the sustainable management of environmental resources. This also explains the inherent critique of the Nexus Approach as a dominantly theoretical, high-level framework with limited application in practice. The UNU-FLORES e-learning programme, by engaging with implementation challenges, is designed to close critical capacity gaps that make practical applications of the Nexus Approach possible – by seeking out nexus opportunities and applying nexus methods.

Driven by Policy Priorities and Countries' Capacity Needs

In order to maintain close links with UNU-FLORES's research activities, prior to the conceptualisation of an e-learning programme UNU-FLORES's Capacity Development and Governance (CDG) unit attached great importance to ensuring that the institute's online courses were policy-relevant and that they responded to governments' needs. In 2013 and 2014, a number of regional consultations related to the concept of a Nexus Observatory (see Section III below) took place in Asia and Africa. Participants in these consultations included research institutes, local universities and ministries from at least five to six United Nations Member States, who were involved in identifying priorities for the region and the thematic direction of the consultations.

The identification of policy priorities and capacity gaps related to nexus challenges for a given region was a key aim of regional consultations. Current programmes, projects and strategies served as the basis on which to start a conversation on the Nexus Approach. Subsequently, nexus research questions and capacity needs were developed collaboratively with partners during and after the consultations. This process ensured that the demands and development priorities of developing countries and emerging economies were addressed according to the needs discovered. It became possible to foster a link between science and policy that is built on transdisciplinary methods (for example, dialogue, cooperation, representation of different disciplines, sectors and levels). Thus, through engagement with Member States, three areas in need of individual nexus competency building were identified, which formed the basis for the development of curricula for three online courses.

"It was a great introduction to the life-cycle cost approach that resulted in a better understanding of this new concept to our developing culture."

2015 course participant

Box 1: Regional consultations held in Africa and Asia in 2013 and 2014

- Life-Cycle Cost Assessment of Infrastructure Projects (2013 Regional Consultation in Asia).
- Water Point Mapping as a Tool for Advancement of the Nexus Approach to Management of Environmental Resources in Africa (2014 Regional Consultation in Africa).
- Intergovernmental Fiscal Relations (a crosscutting theme discussed at all regional consultations).

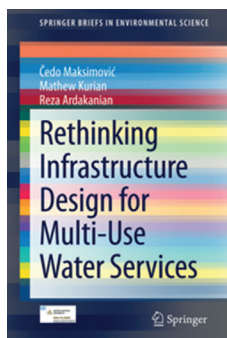
Curricula for Online Courses

The curricula, based on discussions at regional consultations and supplemented by scientific research, connect nexus methodologies and concepts that allow for better management of environmental resources. In addition to promoting the Nexus Approach and supporting nexus competences, the online courses relate to concrete sustainable development problems. This is strengthened by the wealth of

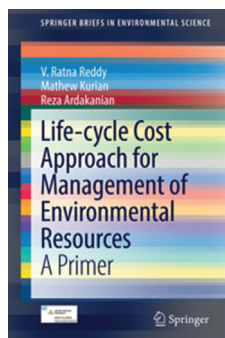
The UNU-FLORES e-learning programme, by engaging with implementation challenges, is designed to close critical capacity gaps that make practical applications of the nexus possible.

case studies and practical examples included in the curricula and lecture content, which connect scientific theory with implementation and thus policy dimensions. That the online course topics were deemed to be both timely and relevant was made clear by the sponsorship that was awarded to a considerable number of course participants by international, governmental and non-governmental organisations.

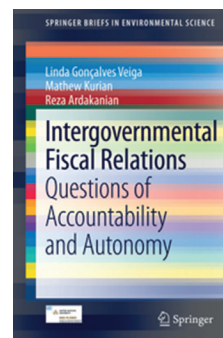
The CDG unit collaborated with three researchers from renowned universities to develop the curricula. In order to remain relevant to the research community as well as to ensure the quality of the material, the research that drew upon international case studies was published in the form of three Springer Briefs. These Springer Briefs serve as textbooks for each of the three online courses (see Section IV).



Reddy, V. R., Kurian, M. and R. Ardakanian, *Life-cycle cost approach for management of environmental resources: a primer*. Dordrecht: UNU-Springer, 2015.



Maksimovic, C., Kurian, M. and R. Ardakanian, *Rethinking infrastructure design for multi-use water services*. Dordrecht: UNU-Springer, 2015.



Veiga, L. G., Kurian, M. and R. Ardakanian, *Intergovernmental fiscal relations: questions of accountability and autonomy*. Dordrecht: UNU-Springer, 2015.

Nexus Competences through Innovation in Didactics Embedded in a Holistic Framework

The Nexus Approach to the management of environmental resources emphasises the importance of trade-offs, synergies and methods that capture the potential for resource optimisation (see Kurian *et al.* 2015 for an elaborate discussion of the Nexus Approach and nexus governance). The curricula, based on discussions at regional consultations as described above, draw upon case studies that highlight the various dimensions of the Nexus Approach to the management of environmental resources by applying nexus methodologies to real-world examples.

In keeping with the objective of the Nexus Observatory to facilitate cross-fertilisation of ideas, a process of mutual learning, knowledge and best practice sharing is encouraged through the utilisation of a number of features integrated in the course programmes. Capacity building should not be viewed as a one-way exercise where knowledge is merely passed on from the instructor to the instructed, with no additional benefits being generated. Instead, a more holistic perspective should be employed that allows for the relationship between those involved to take on a two-way, or even a multidimensional, character. Hence, during the design stage of the e-learning programme, a more fluid approach was taken to allow for additional benefits to arise – for the online course participants, the tutors and in particular for the Nexus Observatory as a whole. By the same token, the courses especially target decision makers and practitioners in developing countries and emerging economies to stimulate the practical application of the methods and approaches covered in the e-learning programme.

The integration of e-learning into the Nexus Observatory through the Blended Learning Platform (see Section III below) allows for the wealth of knowledge and professional/research experiences held by participants to be distilled, summarised and analysed, while concurrently addressing knowledge and capacity gaps. To aid this objective, portfolios are used as a tool for assessment (see next sub-section and Section IV for details). The process and methodology relating to the review of participants' contributions in this multidimensional approach to online learning does not relate to the didactics employed for the e-learning programme and will be considered elsewhere (a summary is provided in Box 2). Nonetheless, it underscores innovations in the design and impact of the programme. These include the mutual benefits for both online course participants and UNU-FLORES research priorities, as well as the different functions and features of the Nexus Observatory that support and are supported by online courses (for a more detailed account of the functions and usefulness of a Nexus Observatory see Kurian *et al.* 2016).

Box 2: Learning from participants' contributions

- Classifying portfolios to generate ideas for policy-relevant research questions.
- Identifying relevant and interesting case studies.
- Identifying research gaps, in combination with an analysis of online course portfolios may lead to further research and funding proposals.

Bridging the Science-Policy Divide

The UNU-FLORES online courses were purposely developed and structured with the aim of bridging the gap between science and policy. This requires being relevant to decision makers and the policy process, while maintaining scientific rigour and independence. An important quality indicator is the peer reviewed textbooks that emanated from the development of the curricula (see above). In addition, working with renowned partners in Germany, namely TU Dresden and IOER, has contributed to the scientific rigour as well as to taking advantage of pools of knowledge that would have remained untapped otherwise. The benefit of allowing partners to teach two of the three online courses includes the fact that knowledge held by renowned local German researchers is disseminated, as well as the fact that ideas are generated for future collaborative research.

By engaging with various types of assignments that cumulate in a portfolio, participants are encouraged to immerse themselves in a topic and adopt diverse perspectives.

By connecting partners through online courses as well as involving them in the general research and capacity development activities of the Nexus Observatory, it is possible to multiply impact, dissemination and uptake of nexus knowledge and methodologies. A number of the partners involved as textbook authors or tutors have subsequently been involved in related UNU-FLORES activities. This supports the formation of knowledge networks between scientists, decision makers and other actors. These in turn support the science-policy interface.

Thus, considering the different elements that contribute to bridging the gap between science and policy yields additional value beyond the mere delivery of online courses for capacity development purposes; it constitutes one way of building an evidence base for informed decision-making, generating political buy-in and addressing capacity needs through a holistic approach.

Further characteristics of the quality of the e-learning programme include the selection criteria for course participants (see below), the marking criteria for assignments, as well as organising learning around a portfolio of different types of assignments (see Table 1).

Table 1: Description of assignments that make up the portfolio	
Short paper: Two page essay on a given question/hypothesis	Total of 20 points
Literature review: Compilation and critical analysis of papers on a selected topic, major similarities and differences examined	Total of 20 points
Policy memo: Two page description of a development problem, proposal statement and justification outlining assumptions and risks, timeline and financial and human resources required for implementation of a proposed action/reform plan	Total of 20 points
Individual presentation: Plan for outcomes monitoring and communication strategy	Total of 20 points
Final course portfolio: Maximum 40 page folder of revised course outputs (described above) with clear explanation of how and why revisions were undertaken	Total of 20 points
	100 points

In comparison with other online courses offered in the field of environmental sustainability, UNU-FLORES aims to provide participants with a structured learning environment that is useful to their current employment or research activities (*practical application and policy-relevance*), while ensuring *scientific quality*. For this reason, a multiple-choice approach, which often leads to passive learning, was not deemed adequate for participants to reflect sufficiently on the acquired knowledge and to apply it to a specific case of their choosing. A key consideration during the design and development of the e-learning programme was the focus on the application of nexus methodologies and concepts, as well as the testing of nexus competences acquired by participants. By engaging with varied types of assignments that cumulate in a portfolio, participants are encouraged to immerse themselves in a topic and adopt diverse perspectives (see Section IV for more detail).

The decision to award certificates only to participants who have successfully completed the online course (meaning an average mark of 50% or higher) is another aspect that differentiates UNU-FLORES's online courses from most other online learning programmes in this field. Likewise, as was described previously, a portfolio approach provides a number of additional benefits. An analysis of participants' portfolios may call attention to a number of national, regional or global priorities, knowledge and capacity gaps, as well as contextual or common challenges, which allows for the definition of policy-relevant research questions and subsequently a deduction of generalisable principles applicable under certain boundary conditions

(see also Section IV below). These findings can be integrated into the UNU-FLORES research programme, developed into a PhD research topic, or form part of a research proposal. All these activities also contribute to accomplishing the goals of the Nexus Observatory (see Section III).

Regarding the online course structure from a more operational viewpoint, a number of elements are worth highlighting. The courses run for 12 weeks (see Table 2). Throughout the duration of the course, participants watch lecture videos, complete complementary reading and carry out their own research, in order to complete assignments. To strengthen the links between scientific and policy dimensions, participants are encouraged to use their own experiences and case studies as examples to illustrate their arguments and their understanding of the course materials.

"All paper assignments were very helpful and I very much appreciated the building up of knowledge and applications within the assignments as a stepwise approach."

2015 course participant

Table 2: Course structure and indicative study workload

Constituent parts of an online course	Workload (hours per week)	Examination/assignment
Introduction	6	
Lecture 1	9	
Lecture 2	10	
Lecture 3	11	Literature review
Lecture 4	9	
Lecture 5	11	Short paper
Lecture 6	9	
Lecture 7	11	Policy memo
Reading week	16	Revise portfolio
Lecture 8	16	Presentation
Lecture 9	12	
Lecture 10 (review)	10	Portfolio submission
12 weeks	130	

During the introduction week, participants are provided with general information, including modes of course delivery, assessment methods, terms and conditions of delivery, assessment regulations and any other relevant information needed for the successful completion of the course. Throughout the course, lecture presentations, videos, notes, instructions for assignments and so forth are made available on a rolling basis. Participants also have the opportunity to interact with each other (through a discussion board) as well as with the course tutor (through a discussion board and by e-mail). In addition to engagement with tutors, the course administrator monitors the Blended Learning Platform regularly, which involves engagement from participants and tutors, and maintains contact with participants and tutors in the event of technical, administrative or programmatic issues.

III. Closing the Gap: The Blended Learning Platform as part of the Nexus Observatory

Goals of the Nexus Observatory

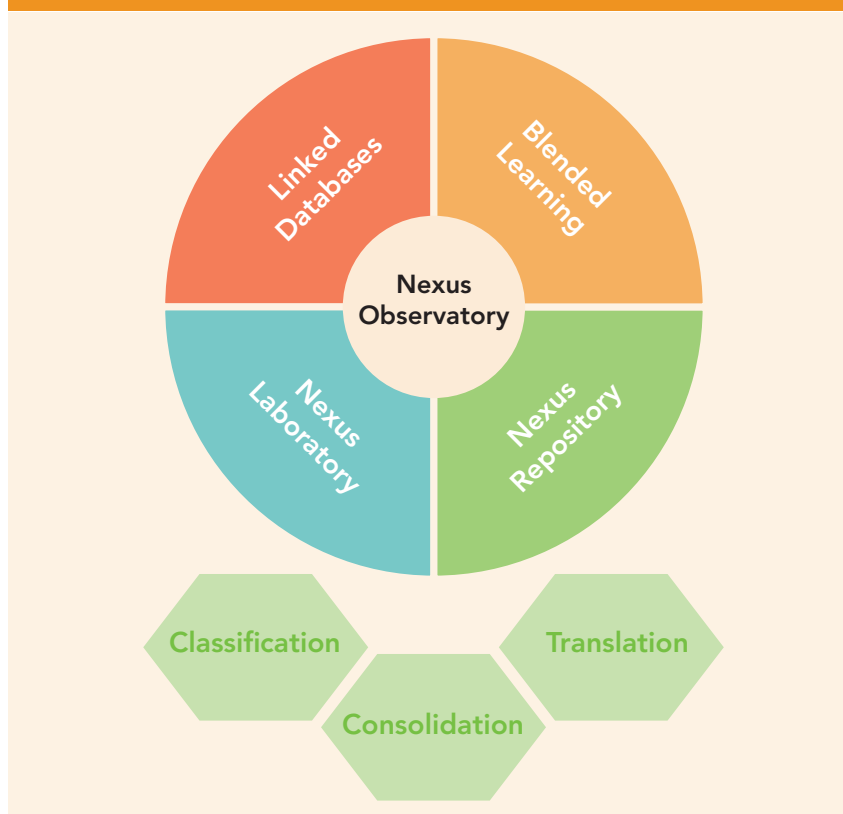
- Bridging the science-policy divide.
- Cross-fertilisation and policy-relevant research.
- Capacity development (on-the-job training).
- Dissemination of insights/ policy advocacy.

The Idea of a Blended Learning Platform

The Blended Learning Platform³ was the first fully functional window of the Nexus Observatory and was put into operation in March 2015 with the commencement of the first round of UNU-FLORES's online courses. The Nexus Observatory, a major initiative of UNU-FLORES, focuses on utilising the idea of a web observatory (Kurian *et al.* 2016) to facilitate evidence-based decision-making. Through its four windows (see Figure 3), the Nexus Observatory can perform its functions, which include the classification of data, consolidation of nexus knowledge and methodologies, and the transfer and translation of data, knowledge and methodologies to support informed decision-making. In combination, these functions enable the operationalisation of the Nexus Approach, which must include inducing political buy-in and advancing dialogue and cooperation.

One crucial part of creating and renewing buy-in from decision makers, practitioners, and researchers regarding nexus assessments, methodologies and governance approaches, is capacity building and the promotion of nexus competences. This is being achieved through the Nexus Observatory Blended Learning Platform. Additionally, the platform contributes to the generation of nexus knowledge, and expansion and review of nexus methodologies, as well as through a collection of case studies that illustrate the implementation and applicability of the Nexus Approach to the management of environmental resources – all of which is carried out in an interdisciplinary/ transdisciplinary manner.

Figure 3: Four windows of the Nexus Observatory and its functions



³ View it here: <https://nexusobservatory.flores.unu.edu/bl/>

As a whole, the Blended Learning Platform consolidates the knowledge that emerges from teaching and learning activities, including: (a) classroom or face-to-face teaching, (b) thematic online courses, and (c) tailor-made training programmes that respond to the demands of decision makers, practitioners and students with an interest in the planning and management of environmental resources. It advances the Nexus Approach through transdisciplinary approaches that promote robust interfaces between education, research and policy dialogue. These support the overall goals of the Nexus Observatory (Nexus Observatory flyer: https://i.unu.edu/media/flores.unu.edu-en/attachment/4460/UNU-FLORES_NexOb_Flyer.pdf): cross-fertilisation, piloting, capacity development, policy advocacy, and impact monitoring.

The e-learning programme reviewed in this technical report forms a central and integrated part of the abovementioned activities (see also the Blended Learning Platform brochure: https://i.unu.edu/media/flores.unu.edu-en/attachment/4461/UNU-FLORES_NexOb_OnlineCourses_Brochure.pdf). This will be highlighted in subsequent sections, where it will become apparent how a holistic approach to science, policy and capacity building in the development, format and structure of online learning enhances learning and teaching experience, as well as offering additional benefits for research and policy.

Development of the Learning Interface

After careful deliberation, *Moodle* was chosen as a suitable interface, because the software is openly available, continuously developed by the computing community, easy to administer (back-end) and user-friendly (front-end). The look and feel of the platform was a very important consideration. This includes the possibility of making content available on a week-by-week basis, giving the course an easily accessible structure, and making it simple for participants to progress through the respective course in an organised manner. Additionally, Moodle offers an integrated assignment submission system that allows tutors to score and give feedback on participants' work directly through the platform. The option of a discussion forum and other features that help organise information and various types of course content (for example, lecture slides and assessment instructions) in a logical and accessible manner further facilitated the choice.

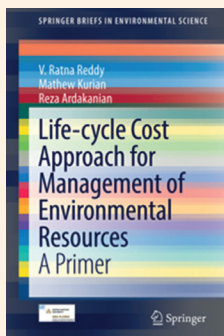
The Blended Learning Platform enables advancement of the nexus approach through transdisciplinary approaches that promote robust interfaces between education, research, and policy dialogue.

Furthermore, research into the functionalities that are compatible with *Moodle* showed that it supports the activities and aims identified for the Blended Learning Platform, and in particular online learning. The option of additional plug-ins and the inherent flexibility of *Moodle* allows for the platform to develop continuously. This means that any feature that is not relevant or possible at this time may be integrated into the platform at a later stage: thereby providing the necessary flexibility for an array of structured, self-paced, short or long, and other types of, online courses. Furthermore, the possibility of adaptation permits ease of adjustment of requirements, and supports a learning-by-doing approach. Thus, future innovations in online learning didactics or novel functions of the Blended Learning Platform can be implemented more easily.

IV. Delivering Nexus Competences: A New Approach to Online Courses

Box 3: Three online courses delivered in 2015 and 2016

As was mentioned in Section II above, the topics for the three online courses that inaugurated the Blended Learning Platform were derived from policy priorities and countries' capacity needs identified during regional consultations. These three online courses were delivered in 2015 and 2016:



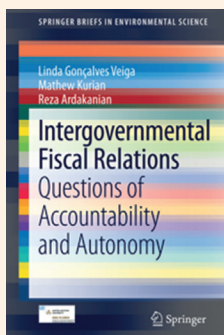
Green Economy and the Life-cycle Cost Approach (jointly delivered with IOER)

The aim of this course is to provide participants with an understanding of why the life-cycle cost approach is essential to achieving the goals of sustainable development: in particular, in the management of environmental resources. The course explores how the life-cycle cost approach can be mainstreamed into governance processes at all institutional levels from local to national, in order to increase the ability and willingness of decision makers to make informed and relevant choices between different types and levels of services. During the course, participants are exposed to key theoretical concepts that are then applied to case studies in the later part of the course.



Rethinking Infrastructure Design for Multi-Use Water Services (jointly delivered with TU Dresden)

The aim of this course is to provide participants with an understanding of the goals and elements of urban water infrastructure systems, and technical options for wastewater treatment and stormwater management. The course draws on international case studies that emphasise the importance of adopting multiple-use perspectives in planning and implementing water and wastewater projects. The role of pricing and costing of infrastructure projects is discussed to highlight nexus approaches to the management of water, soil, and waste resources.



Financing Public Services and Environmental Sustainability (delivered by UNU-FLORES)

The aim of this course is to provide participants with an understanding of the role played by intergovernmental fiscal arrangements in shaping public service outcomes in countries around the world, especially developing countries and emerging economies. Issues of accountability and autonomy are examined to highlight important trade-offs and synergies that are at the centre of the nexus approach to the management of water, soil, and waste. Specific topics include: trends in political decentralisation and the role of public budgets and local governments in supporting the delivery of public services.

Exploring Options

Prior to the implementation of the UNU-FLORES e-learning programme, alternative approaches to the delivery of online courses were explored. Thorough research in this field served two purposes:

- i. development of a unique programme that enables participants to gain nexus knowledge, learn about nexus methodologies, and develop nexus competences, especially with a focus on practical application and exploration of different perspectives (interdisciplinary/transdisciplinary)
- ii. integration into and stimulation of additional benefits for the Nexus Observatory as a whole; this includes bridging the gap between science, policy, and capacity building.

Box 4: Characteristics of the UNU-FLORES e-learning programme

- Strong connection to the Nexus Observatory.
- Integrated approach of delivery.
- Linking knowledge acquisition to current policy challenges.
- Research and curricula based on regionally identified priorities.
- Targeted at decision makers and practitioners in developing countries and emerging economies.
- Tailored questions during the application process.
- Portfolios as assessment tool.
- Engaged learning encouraged (for example, use of discussion board).

A particular aim of the UNU-FLORES e-learning programme is to provide participants with the tools to link their acquired knowledge with current policy challenges, preferably in their home country/region. Nexus knowledge, methodologies and competences are only of value if they can be applied to real-world cases and aid problem-solving. In order to achieve this, an integrated approach was taken, encompassing curriculum development, promotion, application process, delivery, assessment, and certification. In every step, special emphasis was given to the fact that each online course embodies only one part of a broader initiative which has the objective of promoting, advancing, and strengthening the interface between science and policy. For this reason, the curricula were based on priorities identified at regional consultations (as was explained in Section II), a portfolio approach was chosen as the preferred method of assessment (see Section II and below), and courses were especially promoted among decision makers and practitioners in developing countries and emerging economies.

With regard to the application process (see also below), applicants are encouraged to reflect on the relevance of the course topic they would like to pursue early in the process. A question regarding their motivation as well as the potential benefits of the course to their work/research was therefore deliberately included in the application form:

Q: Please elaborate on your motivation for taking this course.

Q: How could this course assist you in your current role? Are there any concrete projects/activities/research for which you are planning to use the knowledge and skills gained through this online course?



Application Process

As indicated above, the application process is a first step in getting potential course participants to reflect on areas where gaining nexus competence may be of use in advancing their research activities or for the implementation of projects as part of their current employment. During the advertisement stage, general information is provided to prospective participants using a number of channels and networks. General information includes the

objective of the programme, the titles of online courses, admission criteria, course fees, discounts, the payment procedure, and the application procedure. More detailed information on course content, learning objectives, and means of assessment is also made available for each of the three online courses.

Box 5: Use of DVDs to increase accessibility

The main reason for choosing DVDs is to cater to individuals based in parts of the world where internet stability is a challenge. This is of particular relevance as the purpose of e-learning programmes includes providing access to knowledge and information in remote locations. Moreover, it makes reaching decision makers and practitioners in developing countries and emerging economies, a particular target audience for UNU-FLORES's online courses, possible.

Research into online courses offered by competitors revealed that they were priced between USD 650 and USD 1,250. Since a key aim of UNU-FLORES's online courses is to reach remote locations in developing countries, the price was set at USD 250. This allows for the recovery of essential costs, including the costs of providing textbooks and DVDs, the mailing of materials, and administration. Despite the low pricing, there were a number of applicants who made enquiries regarding the possibility of discounts or scholarships. In particular, individuals from developing countries frequently struggle to secure sufficient funds, resulting in the withdrawal of their application. Increasing accessibility to online learning and capacity development is one of the reasons for keeping course fees as low as possible. It is clear that the demand for distant learning is high, but cost, even if kept at a minimum, remains a major challenge for many, especially those in the target group (individuals from developing countries and emerging economies).

Box 6: Discounts offered by UNU-FLORES

- 25% for UN staff (this discount may lead to greater engagement and potential collaboration with UN agencies).
- 30% for group applications by an organisation sponsoring the enrolment of three or more participants (this discount may enable the participation of a larger number of individuals from developing countries).
- 30% for former participants and UNU-FLORES alumni.

"I think I am now able to identify measures and options to apply (multi-use water services) concepts to specific cases, particularly in my country."

2015 course participant

One option to overcome this challenge is to encourage government agencies or other organisations to sponsor the participation or encourage universities to accredit the courses. Experience shows that sponsorship allows a more diverse range of individuals to participate in online learning. To support this process, UNU-FLORES offers a number of discounts.

The Applicants

The UNU-FLORES e-learning programme was designed, in particular, to appeal to decision makers and practitioners in developing countries and emerging economies, but it is also attractive to students with an interest in the planning and management of environmental resources. As indicated in previous sections of this report, the course contents and types of assignments have a particular focus on policy-relevance and problem-solving, which make them especially interesting for the abovementioned groups. Theoretical concepts are reinforced by international case studies that add a practical dimension to the taught material and illustrate the applicability of nexus methodologies and concepts. Through pointed assignments that test a number of skills, such as research, case study analysis, addressing policy concerns or communication of a policy/implementation plan, course participants have the opportunity to consider concrete real-world challenges and problems.

Box 7: Admission requirements

- MA/MSc in engineering, natural sciences, social sciences or other closely related fields.
- Good command of the English language.
- Work experience related to management of environmental resources – water, soil and/or waste; experience with local government/non-governmental agencies and think tanks in developing/emerging economies would be an asset.

One aspect that UNU-FLORES considered during the design of the e-learning programme was the question of admission criteria. Bearing in mind the potential for accreditation of online courses in the future, quality assurance is a matter of great concern. This includes the quality of contributions by online course participants. As mentioned in Section II above and below, a number of additional benefits can be derived from an analysis of participants' portfolios, where they are of sufficient quality. Not only are applicants required to fulfil the admission criteria, but close attention is paid to their motivation for participating in the course, as well as the relevance and usefulness of the online course for their current employment/projects/research (see questions included in the application form above).

The selection of participants is carried out by the CDG unit at UNU-FLORES using the criteria set out in Box 7 to assess the suitability of an applicant. This includes particular consideration of an applicant's motivation statement and the potential of the online course to be of use to their current role. Paying attention to these factors is deemed valuable as it places emphasis on the added benefit that nexus capacity building provides. In other words, participants in the e-learning programme have the chance to develop concrete objectives and identify key areas for the application of what they will learn prior to starting the course. This in turn adds a focus on individual and case-specific applications of nexus concepts and methodologies that participants can draw on throughout the course.

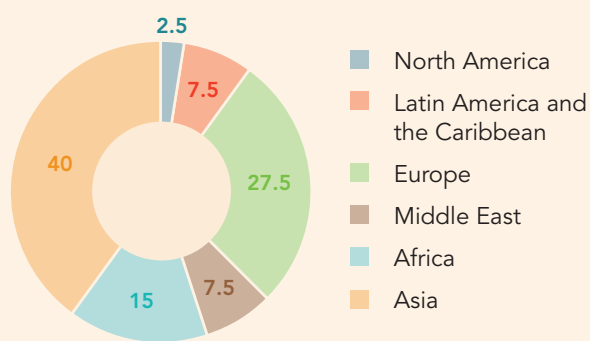
Box 8: Science-policy interface at the application stage

- Applicants provide a motivation statement and details of how their chosen online course is of use to their current role.
- Emphasise the benefits nexus competences have for practical applications.
- Participants identify individual objectives related to their present roles and can then apply the knowledge gained during the course to their chosen case (in their assignments and discussions throughout the course).

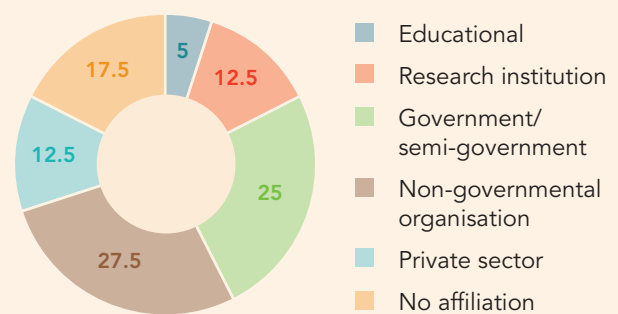
Figure 4: Backgrounds of online course participants in 2015 and 2016

Participants in 2015 (%)

Geographical background of participants

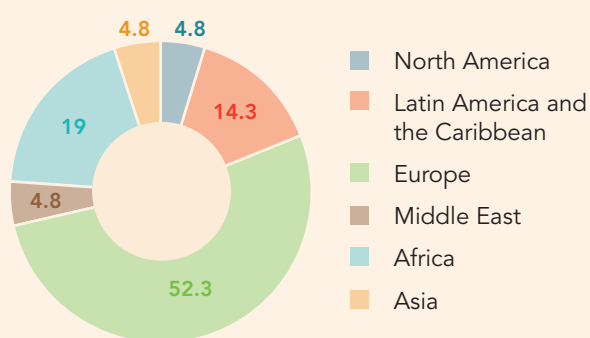


Type of organisation where participants are employed

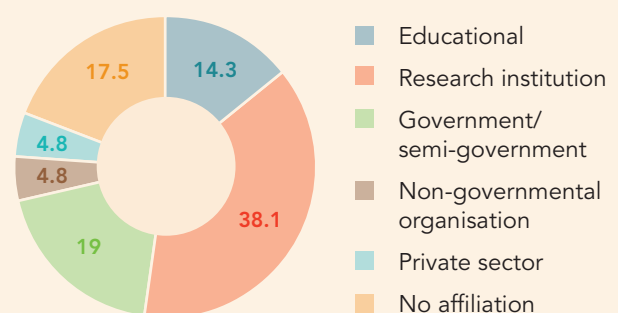


Participants in 2016 (%)

Geographical background of participants



Type of organisation where participants are employed

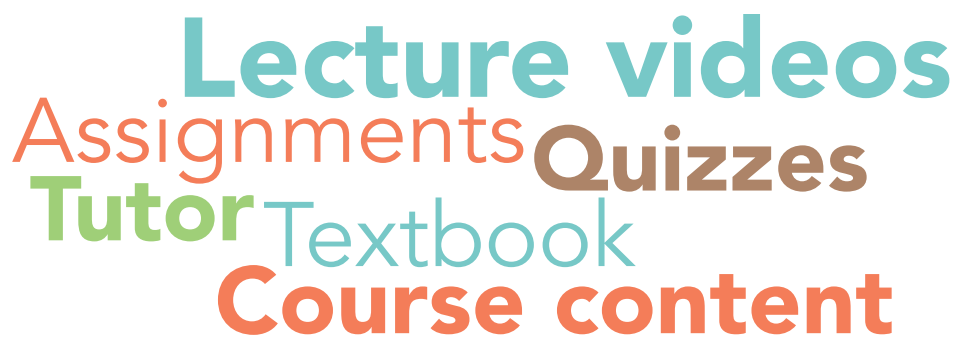


Structured Learning for Nexus Capacity Building

The e-learning programme is organised on a 12-week basis. Each week, participants engage with lecture videos, the textbook, and other readings, quizzes, the discussion board etc. They also prepare assignments as the course progresses. Throughout the course, tutors support learning by answering questions and facilitating or responding to discussions on the discussion board. In the future, this could be supplemented by face-to-face live chats.

What participants in 2015 and 2016 enjoyed most about the e-learning programme

What did you enjoy most about the course? (data from 2015 feedback)



What did you enjoy most about the course? (data from 2016 feedback)



Week 1 of the online courses focusses on providing participants with an introduction to the programme. This includes general information about UNU, UNU-FLORES, the e-learning programme of UNU-FLORES and its relation to the Nexus Observatory, and the online course structure (weekly study load, assessment, marking criteria, etc.). Additionally, specific course information regarding learning objectives, the outline of the course, and tutors is presented. To start a conversation among participants, a number of statistics on gender, type of organisation where participants are currently employed, and geographical background are also shared for each course (see Figure 4).

In this way, participants can get to know their peers better and start their own conversations.

"The information provided in the weekly lectures was very useful and helped me to stepwise increase knowledge and understanding of the subject."

2016 course participant

Additionally, participants are asked to introduce themselves and state their motivation and expectations for the coming weeks. This exercise not only serves as a test assignment submission (for participants to familiarise themselves with the Blended Learning Platform) for the participants and UNU-FLORES, but also as a means for the tutor to gain insights into the backgrounds of participants and their intentions for participating in the course. In this manner, course discussions can be tailored/personalised accordingly.

Every two weeks participants are asked to submit an assignment. Timely feedback on their work is intended to guide their next submission. The topics and instructions for each of the above parts of the portfolio are communicated three weeks before the submission deadline. This allows participants to manage their time and to raise any questions or concerns with the respective tutor(s) or the course administrator. It is expected that participants will work on assignments on a continuous basis. Cumulatively, grades obtained for each of the four assignments, in addition to the final portfolio, form the final grade for the course. As was indicated earlier, only participants who earn a mark of 50% or above will be awarded a certificate at the end of the course.

Examination rules for UNU-FLORES online courses

III. Results of Examinations

Assessment and Notice of Examination Results

7. The Examination assessment results shall be represented on a scale of marks of 1-100. Marks 50 and higher shall indicate a successful result.

It is anticipated that such quality control measures will lead to voluntary (in the short term) and formal (in the long term) accreditation of the e-learning programme. Furthermore, it strengthens the value of the certificate as participants can prove that they have achieved a certain level of nexus knowledge, understanding and competence. The decision to not award certificates of participation to participants who have not fulfilled the requirements stated in the examination rules emanated from these considerations related to quality control.

Portfolios to Build the Science-Policy Interface

During the course, participants are encouraged to reflect on concrete policy issues and apply what they have learned (for example, by analysing and reviewing case studies or projects that they are currently working on). In particular, they are asked to share their experiences and ideas on the discussion board available on the Blended Learning Platform. Experience shows that engagement of course tutors and the level of motivation of participants are determining factors for making the experience a truly interactive one. The discussion board, if used strategically, can offer many entry points for debating practical applications of nexus concepts and methods, and implementation opportunities/challenges. Another innovative way to increase the depth of participants' engagement with the course content and to animate them to consider how it is relevant to their work and the policy landscape is the use of a portfolio to assess their learning – for continuous learning and reflection of the material learned, as well as regular feedback on participants' understanding.

Box 9: Benefits of using portfolios as an assessment tool

- Facilitates continuous learning and reflection through active engagement and practical application of nexus competences.
- Collection of different types of individual assignments focus on a range of skills, methods and approaches.
- Regular feedback on understanding of material learned allows participants to check their understanding and deepen their knowledge.
- Can provide outputs for stakeholder groups and help identify research gaps, policy challenges or further capacity needs.
- Links with other parts of the Nexus Observatory.

As mentioned before, participants are assessed on the basis of a portfolio, which comprises the following items:

- **A literature review** (a compilation and critical analysis of papers on a selected topic, with major similarities and differences examined).
- **A short paper** (a two-page essay on a given question/hypothesis).
- **A policy memo** (a two-page description of a development problem, proposal statement and justification outlining assumptions and risks, timeline, and financial and human resources required for implementation of a proposed action/reform plan).
- **An individual presentation** (a plan for outcomes monitoring or a communication strategy).
- **A final review of the portfolio** (a maximum 40-page folder of revised course outputs with a clear explanation of how and why revisions were undertaken).

A portfolio approach ensures engagement by participants with the material, especially when compared with the traditional format of multiple-choice quizzes. Additionally, a portfolio system overcomes the danger of participants becoming passive learners. Although a time-consuming exercise for both participants (who prepare assignments) and tutors (who grade assignments), this approach is deemed to be very appropriate for increasing the depth of understanding and applicability of nexus concepts and methods, while bridging the gap between science/theory and policy/practice. Not only do participants profit from producing an assignment and thinking through the materials learned, but, similarly, tutors may identify gaps in their own research or grasp of nexus interrelations, as well as expand their own knowledge. In the same manner, analyses and archiving of portfolios will allow for the improvement of training and capacity building activities on the one hand and the enrichment of the Nexus Observatory and UNU-FLORES research efforts on the other.

Not only do participants profit from producing an assignment and thinking through the materials learned, but, similarly, tutors may identify gaps in their own research or grasp of nexus interrelations as well as expand their own knowledge.

"I enjoyed the lectures and assignments. The lectures were interesting and the assignments allowed one to delve deeper into the material and topics."

2016 course participant

So, in addition to serving as evidence of participants' learning, the final portfolio could also provide outputs for stakeholder groups involved in the development of research ideas or topics, subsequently creating links to other parts of the Nexus Observatory. In the future, once the Nexus Observatory is operational, an archive of online course portfolios will be created. Assignments prepared by participants can then be analysed and possible research, policy, and capacity gaps identified that may lead to selection of specific case studies, a PhD project or further research/projects that are policy-relevant. Additionally, online

course participants may become users of other windows of the Nexus Observatory and generate data sets from Nexus Observatory databases that they can analyse and evaluate as part of their portfolio assessments. Examples include case studies, testing methodologies, creating, and using data sets, etc. This would not only increase the user base for the Nexus Observatory, but may lead to further partnerships, fundraising opportunities, and feedback on the usability of the platform itself.

Box 10: Added benefits for the Nexus Observatory

- Archive of portfolios, including case studies and policy challenges.
- Analysis of portfolios may shed light on research gaps, policy challenges and capacity needs in a particular region of the world.
- Network of decision makers, practitioners and researchers with an interest in integrated management of environmental resources.
- User base for the Nexus Observatory that could provide important feedback about the platform.
- Partnerships and fundraising opportunities.

The Role of Tutors

In initial discussions with partners/tutors, the following contributions were expected of tutors:

- Preparation of PowerPoint presentations.
- Recording of nine lectures.
- Responding to participants' questions once a week regarding the substantial part of the course (e-mail and discussion board on the Blended Learning Platform).
- Grading of assignments.

For two of the three online courses, UNU-FLORES works with German partners, namely TU Dresden and IOER. The third course is delivered by UNU-FLORES. Involvement of individual tutors varies due to pre-determined time constraints. UNU-FLORES PhD researchers can fill this gap: this was tested with positive results both in 2015 and 2016. In the future, we will continue to encourage young scientists who would like to develop their skills and assist in the running of the e-learning programme to get involved in accompanying participants through one of the online courses. Experience from 2015 and 2016 shows that an important precondition for the success of tutor-participant engagement is a high-level of motivation and curiosity, especially in relation to the interactive nature of the programme – whether on the discussion board or activities related to assignments.

V. What we can Learn for Nexus Capacity Building

Operationalising the nexus and building nexus capacity remains a challenge. Our approach to strengthening the science-policy interface, employing transdisciplinary approaches and making the e-learning programme an integral part of this process, has proved successful so far. In particular, the strong link to other windows of the Nexus Observatory signifies an innovation that has great potential. Making online learning effective by encouraging application through exposure to different perspectives, as well as real-world case studies, yields great potential beyond educational aspects and the testing of didactical approaches. Nexus capacity building should also aim to advance dialogue, cooperation and evidence-based decision-making. This is achieved through strong links between the different windows of the Nexus Observatory, which all support bridging the gap between science and policy. The UNU-FLORES e-learning programme allows participants to test their acquired knowledge in relation to a project or case that is relevant to them. This is done in a structured manner using a portfolio system. As explained in earlier sections this approach facilitates a deep learning process, but also produces additional benefits for research and practice (for example, identification of research gaps, collection of case studies etc.).

Conditions for Boosting Nexus Competences

Summarising the previous sections, five aspects of why, and under what conditions, online courses are beneficial for building nexus capacity deserve consideration:

1. Online courses should be demand-driven

Capacity building in the area of integrated management of environmental resources from a nexus perspective requires the identification of topics that are not only interdisciplinary, but also employ and highlight the importance of transdisciplinary methods. To do so, regional workshops and consultations, involving researchers, decision makers, and practitioners, were organised in Africa and Asia. These consultations provided a forum for asserting priorities and capacity building needs. Doing so ensures the policy-relevance and timeliness of topics, while addressing crucial capacity gaps among key stakeholders. Developing online courses that are demand-driven also strengthens the links to other UNU-FLORES activities, as well as guaranteeing that research and training remain closely connected to real-world challenges, which in turn facilitates problem-solving.

2. Archive and analysis of online course portfolios

An archive of participants' portfolios may allow for the identification of trends or regional priorities/policy challenges. Review and analysis of portfolios may further allow for the development of research questions that are policy-relevant and that could lead to future collaboration and fundraising opportunities. The review of participants' online course portfolios will contribute to other parts of the Nexus Observatory. Lessons learned and case studies provided by online course participants could be used to prepare policy briefs, generate research questions through gap analysis, provide inputs for infographics, and identify trends and priorities in the topic area. Additionally, an analysis of portfolios provides an opportunity to consider the appropriateness of capacity building measures as they relate to the Nexus Approach. Innovative means of implementing training, learning and development of nexus competences can be explored.

Nexus capacity building should also aim to advance dialogue, cooperation and evidence-based decision-making.

3. Online courses and engagement of participants complement the goals of the Nexus Observatory

Online courses that are demand-driven, as well as an archive of portfolios, have additional advantages for the Nexus Observatory. The Nexus Observatory aims to bridge the science-policy divide through cross-fertilisation of ideas, capacity development, dissemination of insights/policy advocacy, piloting initiatives for knowledge mobilisation, and impact monitoring and evaluation. Engaging with decision makers and practitioners (with their unique backgrounds, expertise, and experiences) through online courses and promoting nexus competences may allow for the identification of pilot projects or future research topics, or bring about partnerships with individuals or organisations with an interest in the Nexus Approach or integrated management of environmental resources.

4. Furthering the objectives of UNU-FLORES by generating policy-relevant research questions and strengthening partnerships

Through activities described in items 1, 2, and 3 above policy-relevant research questions may be generated. These could inform questions for PhD-level research as well as topics for funding proposals. Links may be strengthened further where PhD candidates engage in the UNU-FLORES e-learning programme as course participants or course tutors. Furthermore, through the involvement of partners in the teaching and tutoring aspects of the programme, partnerships can be reinforced, and further collaboration (for example, on a specific research project) become possible. The e-learning programme is also a strong means of deepening existing partnerships with the decision makers and scientists involved in the regional consultations that formed the basis for online course topics. Online courses can be integrated into other capacity building measures (for example, training of trainers).

5. Accreditation as a means of achieving nexus competences

The awarding of credits as part of the European Credit Transfer System (ECTS) would support the mainstreaming of nexus perspectives in sustainable development education. In this regard, it has been proposed that TU Dresden assist with the facilitation of the accreditation process. In addition, participants should be encouraged to negotiate regarding the possibility of accreditation with their institution (this was the case in 2016, where one institution awarded credits that were counted towards the participant's degree). Accreditation of online courses would not only serve as evidence of their quality and rigour, but would allow for a truly blended learning system (for example, as part of the joint TU Dresden-UNU-FLORES PhD programme or training of trainer courses).

The key findings of the report are summarised in the table below. A number of important areas are highlighted that contributed to the success of the UNU-FLORES e-learning programme.

Table 3: Summary of key findings of the technical report

	Blended Learning Platform	Content of online courses
Design of online courses	<ul style="list-style-type: none"> • Integrated into the Nexus Observatory. • Moodle serves as the Blended Learning Platform; chosen for its user-friendliness and selection of integrated tools. • Online courses targeted, in particular, at decision-makers and practitioners from developing countries. • Course fees kept at a minimum to reach a broader audience and make them affordable to individuals from developing countries and emerging economies. 	<ul style="list-style-type: none"> • Demand-driven and based on regionally identified priorities and capacity needs. • Based on policy-relevant research, published in the form of SpringerBriefs; this also ensures research excellence and serves the dual purpose of online course textbook and dissemination of research outputs. • Strengthens the science-policy interface. • Use of portfolios as a means for assessment of participants' learning. • Working with partners is beneficial.
Delivery of online courses	<ul style="list-style-type: none"> • Encouraged participants' engagement and interaction through the discussion board on the Blended Learning Platform. • Regular assignments forming a portfolio facilitated continuous learning and active engagement with course materials; feedback on assignments allowed participants to identify gaps in their learning. 	<ul style="list-style-type: none"> • Joint delivery with partners as well as engagement of PhD researchers as tutors adds value. • Tutors themselves expand their own knowledge/ research interests by engaging with participants. • Course materials included a textbook, a DVD with lecture recordings, and the Blended Learning Platform brochure, which were mailed to participants. • A focus on case studies illustrates practical applications of nexus methods.
Evaluation of online courses	<ul style="list-style-type: none"> • Strong links between the Blended Learning Platform and the other parts of the Nexus Observatory produce additional benefits beyond educational insights. 	<ul style="list-style-type: none"> • Most participants chose a course out of personal interest, for professional development reasons or because it was complementary to their research activity. • Parts enjoyed most by participants: lecture videos, assignments and course content. • Combination of policy-relevance and research excellence should be a feature of all future courses as this strengthens links between science and policy.

References

Kurian, M., and Ardakanian, R. (Eds.). (2015). *Governing the Nexus: Water, Soil and Waste Resources Considering Global Change*. Dordrecht: Springer.

Kurian, M., Ardakanian, R., Veiga, L. G., and Meyer, K. (2016). *Resources, Services and Risks: How can data observatories bridge the science-policy divide in environmental governance?* Switzerland: Springer.



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**Institute for Integrated Management
of Material Fluxes and of Resources**

The United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) was established in Dresden, Germany in 2012 with the support of the Federal Ministry of Education and Research (BMBF) and the Ministry for Higher Education, Research and the Arts (SMWK) of the Free State of Saxony, Germany. As part of the United Nations University (UNU), the Institute helps build a bridge between the academic world and the United Nations. UNU encompasses 13 research and training institutes and programmes located in 12 countries around the world. UNU as a whole aims to develop sustainable solutions for pressing global problems of human survival and development.

UNU-FLORES develops strategies to resolve pressing challenges in the area of sustainable use and integrated management of environmental resources such as water, soil, and waste. Focusing on the needs of the UN and its Member States, particularly developing countries and emerging economies, the Institute engages in research, capacity development, advanced teaching and training as well as dissemination of knowledge. In all activities, UNU-FLORES advances a Nexus Approach to the sustainable management of environmental resources.

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ADVANCING A NEXUS APPROACH TO THE SUSTAINABLE MANAGEMENT OF ENVIRONMENTAL RESOURCES

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