Guidebook for Virtual Exchanges

Lessons learnt from the "Climate University for Virtual Exchanges" (CLUVEX) project in 2023-2026

version 1.0

ERASMUS+ CLUVEX Project Number 101111959

Work Package 02
Deliverable 2.1

16th January, 2024

This document is the 1st version (16th Jan.2024) of the "Guidebook for Virtual Exchanges – Lessons learnt from the Virtual Exchanges (CLUVEX) project". The document has been written by the CLUVEX teams of University of Helsinki (UH, Finland), University of Copenhagen (UCPH, Denmark), Odessa State Environmental University (OSENU, Ukraine), Taras Shevchenko National University of Kyiv (TSNUK, Ukraine) and the Bioart Society, Finland.

This document is the 1st version of a living document / interactive document, which will be expanded in a cumulatively manner by the CLUVEX teams based on experiences of the CLUVEX Virtual Exchanges (VEs) for moderators and students.

The updates to this document in the ECAS portal will be made as Deliverable(s) 2.5 on Month 12 and Minth 18 called as "Living Annex to the Virtual Exchange Guidebook"

Lead editors: Hanna K. Lappalainen and Maria Domingues, INAR, University of Helsinki

Contributors to this document:

University of Helsinki, Institute for Atmospheric and Earth System Research (UH-INAR)
Hanna Lappalainen, Alexander Mahura, Laura Riuttanen, Alla Borisova, Maria Dominguez

Odessa State Environmental University (OSENU)
Sergiy Stepanenko, Oleh Shablii, Valeriya Ovcharuk, Inna Khomenko

Taras Shevchenko National University of Kyiv (TSNUK)
Olga Shevchenko, Andrii Gozhyk, Sergii Zapototskyi, Sergiy Snizhko

Yerevan State University (YSU)
Alexander Markarov, Arsen Aproyan, Karen Chazaryan

The University of Copenhagen (UCPH)
Alexander Baklanov, Eigil Kaas, Roman Nuterman

Bioart Society
Piritta Puhto, Yvonne Billimore

Table of Contents

Contents

1. INTRODUCTION

> *"Virtual Exchange (VE) is a practice, supported by research, that consists of sustained, technology-enabled, people-to-people education programmes or activities in which constructive communication and interaction takes place between individuals or groups who are geographically separated and/or from different cultural backgrounds, with the support of educators or facilitators. Virtual Exchange combines the deep impact of intercultural dialogue and exchange with the broad reach of digital technology"* https://evolve-erasmus.eu/about-evolve/what-is-virtual-exchange/.

The possibilities of VE and remote teaching were awakened in connection with the global COVID-19 pandemic as the only alternative for education. Although the role of VE in education may increase in future, the massive online courses´ offers from the last years may confuse and demotivate students into fully virtual education formats. Because of that, VE education should be carefully planned to develop advantages (e.g., guided education, integrative and reachable for boarder range of students' situations, international networking, actualized and scientific based knowledge) and minimize inconveniences or challenges (e.g., online active participation, technological-internet resources, language barrier).

This Guidebook for Virtual Exchange is a e-living document that used "Climate University for Virtual Exchange" (hereinafter CLUVEX), as reference for lessons learnt during planning and execution of VEs. As it is a living document, the content will be modified and updated accordingly to the experiences of experts, moderators, and students participating in CLUVEX Ves weeks, at least, during the CLUVEX project lifetime.

CLUVEX is a three-year project (1 Jul 2023 – 31 Jun 2026), funded by European Commission (Horizon 2020 programme), coordinated by the University of Helsinki (Finland) and implemented in cooperation with CLUVEX partner universities: University of Copenhagen (Denmark), Odessa State Environmental University (Ukraine), Taras Shevchenko National University of Kyiv (Ukraine), Yerevan State University (Armenia), and Bioart Society, an art & science non for profit association based in Finland. CLUVEX's thematic areas are the following: "climate action, environment and nature protection", "environment and climate change" and "green skills". CLUVEX project trains climate competences to university students (at BSc, MSc, and PhD levels of education as well as including PostDocs) from different countries and multidisciplinary topics. In addition, CLUVEX develops and research, how distance education and a VE concept can be developed further to motivate students to continue learning in massive open online courses (MOOCs).

At the current ongoing planning stage of VEs for students (expected to take place in Autumn 2024), this guide especially describes challenges and key questions to consider when planning the implementation of VEs for international, multicultural and multidisciplinary students and educators.

1.1. The importance and challenges of Virtual Exchange (VE) in climate education and training

Education is an essential factor in the ever more urgent Global Grand Challenges like global fight against the climate change. VE enables larger number of students to access the latest knowledge, for example, on climate change, than the traditional, face-to-face, on-site education. VE enables education and interaction, and especially for students with low international mobility possibilities due to different reasons. In case of climate action, new climate knowledge and competences help students to understand and tackle the consequences of global warming and biodiversity loss, encourages them to change their behaviour and helps them to adapt to what is already a global emergency. Climate change is a global problem with local dimensions, also affected by local economical and socio political situations. Sharing the different experiences of success/failed climate actions and circumstances, will enable students to see climate problematic from new perspectives, and may inspire them with new alternatives for climate mitigation and adaptation actions more applicable in their circumstances.

Virtual Exchange has also a transnational dimension. VE can be used for wider distribution and piloting of climate competences in Europe, in Neighbourhood East countries or globally, not only for the university students but also for other audiences and communities at schools and training and knowledge centres. The VE in CLUVEX emphasis on transformative climate action in building competences on environmental sustainability. Transformative action refers to activities that bring about changes in moral values and lifestyle patterns and green skills shaping practices in society, as well as changes in structures of society and culture.

Beside large of positive aspects, organisation of VE is a challenging task. Realisation and well-functioning of VE involve many practical arrangements, such as selection of technical platforms (for example, Zoom, MS Teams, BlueJeans, Webex, Lifesize, etc.) for communication, attractive calls for participation, registration of participating students and moderators in selected systems with learning environment (for example, Flinga https://flinga.fi/, DigiCampus https://digicampus.fi/, Moodle https://moodle.org/, etc.), or possible procedures for issued credits conversion and acceptance in home universities of participating students. There are pedagogical and communication issues to consider in the organisation of VE, how to motivate students to be committed, actively study and participate in a fully remotely teaching and socialising way. Another challenge is a possible language barrier, it is important in advance to take care of supportive approaches and tools needed in group work during VEs. Additionally, it may be also challenging to train moderators for VEs. Moderators play a key role in keeping an integrative and comfortable atmosphere in the group. It is important to find new ways and

methods to facilitate the effective online learning and communication. For VEs, practical exercises for group/team work should also be developed and prepared in advance and in such a way that students, having different educational background and coming from different disciplines, can participate, learn and successfully complete exercises.

Summary of advantages of virtual exchange:

✓ Large number of participants from different geographical regions, countries, environments and cultures
✓ The interactive nature of VE with the moderated groups discussions lowers the barriers to participate compared with that self-learning based and MOOCs.
✓ Enables and supports the faster, more frequent and more efficient networking with students having different backgrounds
✓ Supports thoroughly inter- and multidisciplinary education and dialog, compared with that on the onsite interexchange programs designed for the same study discipline.
✓ Networking for low mobilisation possibilities and limited funding for travelling, in CLUVEX case, bridging students from European and Neighbourhood East universities.
✓ Interdisciplinary people-to-people learning: to engage students having different educational backgrounds with climate-relevant competences and green agenda together with interdisciplinary, green and soft skills
✓ Practical climate solutions, locally applicable: to map different climate and environmental problems and interchange different potential solutions that can be locally applicable in students' home environment

Summary of challenges of virtual exchange:

✓ Technical challenge: since teaching and interchange occur fully online, it is needed to guarantee software and hardware equipment e.g computers, stable internet access, virtual communication tools, systems with learning environment, and others for all students participating in virtual exchange
✓ Language barriers
✓ Organisational issues like conflicting of VE schedules with home university programs and other courses when organising the VE events (e.g., course, workshop, training, school), transferring and accepting of obtained credits at home universities.
✓ Making compatible of planned VE with home studies
✓ Motivation and commitment of student for fully remote interchange
✓ Equity guarantees: How to solve equity in gender/culture/religion/political situation/ and technological resources

1.2. CLUVEX project, a reference for the lessons-learnt on VEs

CUVEX project was elaborated during COVID-19 pandemic time when possibility of face-to-face communications between different countries and organisations was very uncertain due to frequently implemented restriction measures, lockdowns, and guidelines. In addition, sustainability and carbon neutrality is one of the main CLUVEX´s discipline and discussion topics, thus travelling is highly questioned. CLUVEX was built on the Climate University (CU) online

learning education with the idea that students, first participating in CLUVEX could further join also some CU´s online courses (https://climateuniversity.fi). Climate University was developed and hosted by the University of Helsinki and has already been piloted, since 2018, in 25 higher education institutions in Finland.

CLUVEX aims to bridge students from European and Neighbourhood East universities, enhancing international collaborations, and engaging them with climate competences, e.g., different ideas of adaptation and mitigation to climate change and the green agenda together with interdisciplinary and soft skills. The project's main activity is to organise the interactive online courses including traditional education materials in a way that students, professors, and teaching assistants will work together in small, moderated groups. During the 3-year project, CLUVEX aims to educate 2500 students from higher education institutions (HEIs). The half of the participants will be recruited by the universities of Denmark and Finland, and the other half from universities of Ukraine and Armenia as Neighbourhood East countries. All the partners bring their technical tools together with pedagogical expertise for designing new VE.

Project also uses its networks like Una Europa, an alliance of 11 European universities, World Meteorological Organization's (WMO) Global Campus initiative, in Europe and Neighbourhood East to attract other participants on a diversity basis.

Thus, the VE cooperation complements and compensates opportunities of physical mobility for students interested in the climate change. CLUVEX partners in Ukraine and Armenia have an especially important role at a global scale. By the end of the project, all the CLUVEX educated so-called the "Climate Messengers" i.e., all students who attended and successfully passed the CLUVEX VE Week, could provide a much-needed expertise in labour markets. The major outcome of VE is nurturing the generation of young people with competencies and skills of the Climate Messengers who will be competent in building climate awareness and sustainability strategies in their home countries, home organisations and future work life.

CLUVEX overall aims

- ✓ **International education**: to educate 500 students in 1 Virtual Exchange (VE) Week (5 VE weeks in total); 2500 students in total during a 3-year project.
- ✓ **Awakening climate expertise interest in multiple disciplines as background**: for 3 years to educate as Climate messengers all 2500 students coming from different background disciplines.
- ✓ **Digital and global-working skills**: students will get training course materials, new digital tools to be used in their future careers.
- ✓ **Promoting the VE concept**: continue networking beyond the CLUVEX project lifetime.
- ✓ **Promoting global dialogue**: CLUVEX will work with small groups that need to work together, to think in a common task, listen to each other's opinions and circumstances, and outcome with an equally-group-design project.

The specific CLUVEX aims and indicators for achievement as a reference

Obj-1 to bridge and bring together students from European and Neighbourhood East countries universities and engage them with climate competences and soft skills

❖ Obj-1 issue/challenge/gap does the project aim to address: There is an urgent need to educate the climate competences of the academic youth and make them "Climate Messengers". Especially, the climate related political decisions of Neighbourhood East countries are and will be affecting the atmospheric composition in their regions but will also have a global scale impact on the future development of mankind. Virtual exchange would enhance sharing of science-based knowledge and climate competences among young academics and would be used for the first time at this scale and volume of climate education. There is also a know-how gap in the soft skills of academics. Joint research across different geopolitical regions is needed to solve global challenges and soft skills, like cooperation, trust, assertive communication, problem solving and self-evaluation (Mangrulkar et al. 2001) are especially relevant skills in the future research collaboration in the field of climate change research.

❖ Obj-1 indicators for measuring achievement: a unit of measurement: number of students participated and passed the virtual exchange / Climate University course

❖ baseline value: 0   >> target value: 2500

Obj-2 to develop and design a new, tailored Virtual Exchange concept for climate education and training

❖ Obj-2 issue/challenge/gap does the project aim to address: there is no existing concept and/or materials where in the e-education the communication and interactions are such strongly addressed as a part of virtual learning related to Earth science and climate change.

❖ Obj-2 indicators for measuring achievement: a unit of measurement: Guide for VE and Guide for climate literacy are ready

❖ baseline value: no existing materials >> target value: 2 Guides

Obj-3 to educate new facilitators and moderators with climate competences and soft skills for VE

❖ Obj-3 issue/challenge/gap does the project aim to address: there is a limited number of specialised teachers / assistant / moderators who have been also trained in soft skills, digital skills and virtual exchange skills.

❖ Obj-3 indicators for measuring achievement: a unit of measurement: number of educated moderators and facilitators

❖ baseline value: 0 >> target value: min 50 in total, min 10 per partner organisation

Obj-4 to educate university students to act as Climate Messengers in society

❖ Obj-4 issue/challenge/gap does the project aim to address: to implement Climate Literacy Virtual Exchanges and International online courses, to select and compile the best VE practices of the consortium partners and Climate University

❖ Obj-4 indicators for measuring achievement: a unit of measurement: number of students participated passed the online course(s) and tailored VE exercises having "Climate Messenger" certificate

❖ baseline value: 0 >> target value: 2500

Obj-5 to upscale and distribute information on Virtual Exchange as a powerful tool bring

> *students together from across wide geographical distances*
> ❖ Obj-5 issue/challenge/gap does the project aim to address: students are not involved in international activities on climate and ecology, because the majority of international courses/schools/joint activities require fees and, therefore, exclude economically disadvantaged students
> ❖ Obj-5 indicators for measuring achievement: a unit of measurement: number of education / research networks / universities contacted / international students collaborations in Europe and Neighbourhood East countries
> ❖ baseline value: 0 **>>** target value: 20

2. PLANNING AND IMPLEMENTATION OF VE

2.1. Key considerations for planning VE

There are several issues to consider when making a detailed implementation plan for organizing VEs. As a first plan, and considering CLUVEX as reference project for lessons-learnt, we listed several aspects and key considerations detected in this first plan of implementation, listed in here below and developed in more detail in the following subsection

Consideration	Key aspects for planning	
#1. Work Organization	**#1.1.**	Selecting equative working tools available for all CLUVES partners
	#1.2.	Equative distributing the preparatory work within the CLUVEX partners.
	#1.3.	Establishing the collaborative working environment, inter-collaborations.
#2. Education	**#2.1.**	Determining learning outcomes for VEs.
	#2.2.	Elaborating joint practical group exercise for students participating in VEs.
	#2.3.	Preparing VE program for VEs including plenary talks and group/team work, topics and questions for joint discussions on the group exercises.
	#2.4.	Preparing materials like Virtual Exchange Guidebook (VEG), Climate Literacy Guidebook (CLG), Climate Messenger Code of Conduct (CMC), and other instructions for students participating in Ves
#3. Students	**#3.1.**	Planning the Call-for-Virtual-Exchange-Week events, e.g., advertising materials like flyers, promoting benefits for participants (knowledge transfer, VE certificates, ECTS credits), integration into university curricula and academic programs.
	#3.2.	Setting up and opening the online registration web-form for students planning to attend VEs.
	#3.3.	Developing and establishing basic principles, criteria and procedures for selecting students to VE, e.g., gender balance, promoting diversity, inclusivity and equity.
	#3.4.	Integration of the credits into curricula at the participating universities.
	#3.5.	Organization of the certificate (in addition to credits) for all the students who participated the VE.
#4. Moderators	**#4.1.**	Organising the Call-for-Moderators.
	#4.2	Educating moderators for planned VE Weeks, including the technical skills (using Zoom, DigiCampus, Flinga), soft skills (handling challenges and conflicts effectively) and contented,

Consideration		Key aspects for planning
		e.g., group exercise based issues; ensuring ethical and responsible behaviour online.
#5. Technical e-setups	#5.1.	Selecting and installing the e-platforms and e-tools (e.g., DigiCampus, Flinga, Zoom).
	#5.2.	Selecting approaches and technical tools to overcome language barriers
	#5.3.	Recruiting technical staff during the VEs in support of making stable and effective technical connections and communication channels.
#6. Evaluation, assessment, studying and developing the VE concept	#6.1.	Gathering feedback from the participated students and moderators.
	#6.2.	Studying the learning outcomes with different methods (e.g., questionaries, interviews, etc.).
	#6.3.	Using assessed data/results for further program improvement of VEs (e.g., including updating CLUVEX developed VEG, CLG, and CMC, publishing peer-reviewed articles).
#7. Science Communication, and Scaling up	#7.1.	Effective communication tools (website, social media) and strategies for climate science topics. Strategies for scaling up the VE concept and VE Week programs.
	#7.2.	Promoting VE outcomes and networking beyond the CLUVEX project lifetime.
	#7.3.	Ensuring long-term sustainability and university/ institutional support.
	#7.4.	Fundraising and resource allocation.

2.2. CLUVEX implementation plan and lessons learnt

#1. Work organization

To organize collaborative working environment within all the partners, we need to select software tools available for all the collaborators. CLUVEX project established a common e-platforms, as intranet Google Drive, for members of the consortium. It allows organizing project documentation and enabling online editing of joint documents. For the communication, CLUVEX also organizes online meetings monthly, and one on-site meetings each year. Each Work Package (WP) has WP Leader and co-Leader. The CLUVEX VEs workflow is shown in Figure 1.
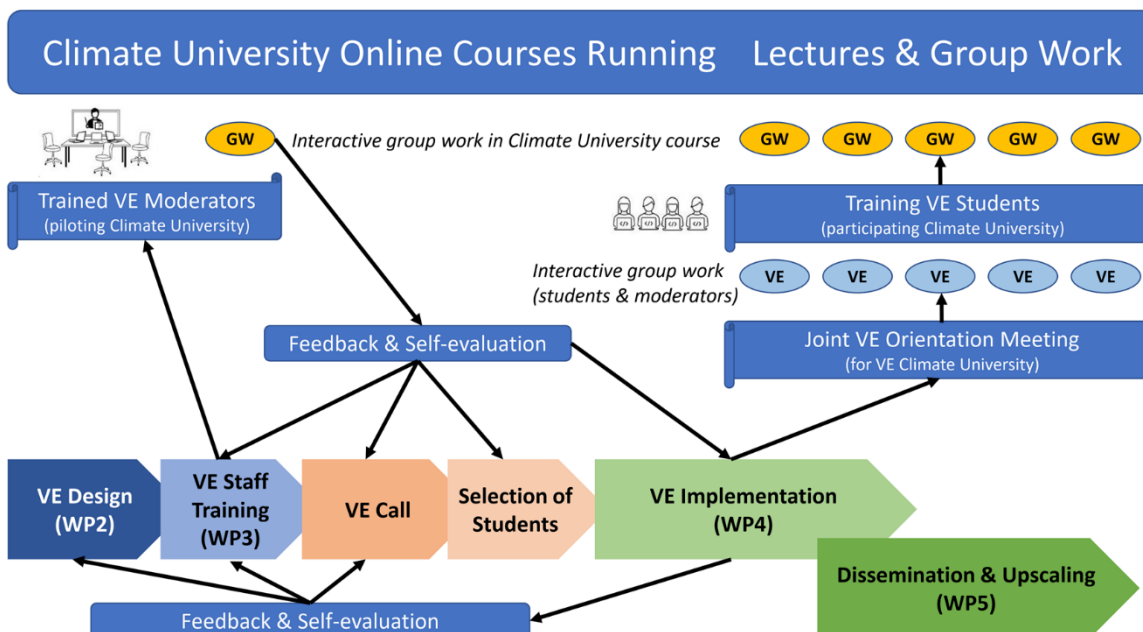
Figure 1: The CLUVEX project VEs workflow showing interconnections between WPs including Calls for VE Weeks for students for VEs, training of moderators and students in VEs, feedback and self-evaluation, and group work.

For the lessons-learnt, a summary e-living document was created to follow up and keep track of the challenges for planning and executing the VE Weeks. At start, in the first planning the following key questions were included to consider (as seen in Table 2).

Table 2: Lessons-learnt from the CLUVEX VEs for moderators, students and course materials vs. considerations and proposed solutions (e-living document to be updated after each VE Week).

Planning subject	Considerations	Proposed solutions
Moderators	-Staff/ students from SAB (Student Advisory Board)	both are welcome
	-Working/ training hours for training of moderators	45+h for fixed work (3h per day/ 3-4d/ 5 trainings for moderators)+
	-Working/ training hours for training of students during VE Weeks	60+h for fixed work (3h per day/ 4d/ 5 VE weeks)+
	-Compatibility with work/ studies	to be mapped
	-Equipment/software availability	to be mapped
	-Motivation	Certificate on obtained competences and skills (2 credits) after 5 trainings; added educational activity/teaching to personal CV
Students	-Compatibility with studies	Plenary talks recorded & publicly available

	-Timing for VE Weeks	12+h for fixed work (3h per day/ 4d/ 1 VE Week)+
	-Equipment/soft availability	to be mapped
	-Motivation	Pre-questionnaire
	- Dealing with enrolling	to discuss : (i) just to get credits vs (ii) too much work is expected although high expectations
Course materials	-Multiple background	Teaching material as general understanding for expertise/non expertise (Natural/Climate sciences) Compensation with activities (applicability for every day's life)
	-Motivation for online platform	Activities planned to interact actively and self/independent work
	-Language barriers	Supported by home universities?

#2. Education

#2.1. Determining learning outcomes for VEs.

The potential list of learning outcomes (LOs) and obtained skills (OSs) for the CLUVEX VE Weeks was determined during the project hybrid kick-off-meeting (30-31 October 2023), and will be further refined and updated. The first draft planned for VE LOs were the following:

After the VE Week, student will be able to:
1. (LO#) Explain basics of climate system and its change, based on latest science. Human role in climate change and mitigation adaptation
2. (SK#) Critically reflect their own views on climate change, sustainability, and create new visions.
3. (LO#) Reflect different international and intercultural perspectives on climate change and sustainability.
4. (SK#) Work in different online working environments.
5. (SK#) Do international teamwork and manage small projects.
6. (SK#) Communicate and present their work in English.

#2.2. Elaborating joint practical group exercise for students participating in VEs.

We are planning joint and practical activities where it is required active participation of all students (see following sections)

#2.3.Preparing VE program for a VEs including plenary talks and group/team work, topics and questions for joint discussion on the groups exercise

In CLUVEX the implementation and the timeline of the Virtual Exchange Calls will be adjusted to the Climate University (CU) on line MOOCs' annual schedule. All the current Climate University on-line courses are continuously carried out at UH during the following teaching periods: 1st period in September – October, 2nd in November – December, 3rd in January – February, and

4th in March – May. Typically, one online CU course module lasts 1-2 periods, and the courses are evenly distributed throughout the year. Currently, there are, at least, courses:

CLIMATE UNIVERSITY

https://climateuniversity.fi/

- ✓ Sustainable.now (5 ECTS) in the 1st period
- ✓ Climate.now (2 or 5 ECTS) in the 2nd period
- ✓ ClimateComms.now (2 ECTS) in 3rd period
- ✓ Leadership for sustainable change (5 ECTS) in 3rd period
- ✓ SystemsChange.now in 3rd-4th periods
- ✓ Solutions.now in 4th period once every year.

During a 3 three time, in total, 5 VE Calls will be announced (in particular, for Spring and Autumn semesters, and the first Call starting from Autumn 2024). Each VE Call will invite 500 students from the Partners' Universities as well as other Universities in European and Neighborhood East countries (i.e., 250 students from University of Helsinki and University of Copenhagen and other EU countries' universites as well as 250 students from project partner universities in Ukraine and Armenia and other Neighborhood East countries).

The planned VE Week(s) will last 5 days, from Monday to Friday, 3 hours each day with lectures, discussions and teamwork. In addition students will have 5 extra hours of independent work, to have in total 20 working hours, corresponding to 1 ECTS.

The Climate Literacy book (CL) serves as pre-material of the VE and incudes explanatory short tasks to understand the planed team work. The pre / post questionnaire with practical and motivational questions will be sent in advance / after to the students. This material and feedback will be used also for developing the virtual exchange concept.

During the VE week, there will be lectures and tutorial about climate change related topics topics and about tools (e.g. https://interactive-atlas.ipcc.ch, https://tntcat.iiasa.ac.at/SspDb/dsd,http://82.76.32.108/IAP2, https://cds.climate.copernicus.eu/cdsapp#!/software/app-era5-explorer?tab=app) used in different aspects of CC estimations, mitigations and adaptation models, e.g. as the used in IPCC scenarios.These lectures and tools will help the students to investigate the causes for current CC situation at their home/environments, and design a road-map for a better (their own) dream of future(s) related to climate change. The Present, Past and Future scenarios of CC of each student will be mapped filling a Utopia-canvas (see Figure here below). In the last day, students will work in a common Future, chosen bythe group (of 10 students). The main idea is that students will experience complexity of local and global environmental and climate changes, and discussions

for a common future. At the end of the week, students will give feedback on the VE week and will be encouraged to write letter in pairs regarding to each other's "utopia".

Table 3. *Tentative content of virtual exchange week*

Day	Topic	Time	Group
1	Joint opening (Coordinator + WP leaders): − Wellcome & general intro to VE week − Working and communication instructions	30 min	All students (500s)
	Tutorials per partner (15 min each) − Helsinki: Climate change (CC) and Climate-Earth ecosystems interactions + IPCC scenarios & tools) − Copenhagen: Air quality (AQ) (exploring tools) − Yerevan: CC/AQ and society/social impacts/interactions (exploring tools) − Kyiv: Hydrometeorology + weather forecasting tools − Odessa: Water cycle/hydrometeorology − BioArt: Critical and artistic thinking in CC. Complexity, interconnectivity, interdependency of CC	1 - 2 h	500s
	Division into small groups: − Introduction round − Introduction to main task - building Utopia canvas	20 min 30 min	10 students (10s) Moderator (M)
2	Introduction to de the day Topic: PRESENT (current CC situation) Tools available to use in exercises	30 min	500s
	Division in small groups: − Summary of tasks: Utopia canvas (Figure 2) − Mapping PRESENT in each student's environment	15 min 2 h 15 min	10 s On your own
3	Introduction to the day Topic: PAST (Historical causes for current CC) Tools available to use in exercises	30 min	500s
	Division in small groups: − Sharing PRESENT	1 h 30	10s

		min 1h	On your own
	− Mapping PAST in each student's environment (Causes)		
4	Introduction to the day Topic: FUTURE (different scenarios for CC) Tools available to use in exercises	30 min	500s
	Division in small groups: − Sharing PAST − Mapping FUTURE, what would you like to change, hopes/dreams for future − Sharing FUTURE	1h 1h 30 min	10s 10s
5	Working on common (group) utopia	2h	10s
	Joint ending − Concluding/closing words of VE week (Coordinator/WP leaders?) − Sharing COMMON Utopias	10 min 45 min	500s Random zoom rooms (50??)

Figure: *Utopia canvas*

#2.4. Educative material for VE

Educative material should include the topic material (in CLUVEX case regarding to Climate change) and also instructions of soft skills needed during the VE week (how to behave and participate in the online discussions) and beyond project, as Climate competent. In addition, to evaluate and develop VE and virtual education, it is important to commonly develop a Virtual Exchange Guidebook (VEG), as the current one.

In CLUVEX we are developing a Climate Literacy Guidebook (CLG), which includes the latest research findings on climate research and links to useful tools used by climate expertise, and a Climate Messenger Code of Conduct (CMC) where we are summarizing the code of conduct during and after VE for participants.

#3. Students.

#3.1. Planning the call for Virtual Exchange weeks

Plan for advertising materials like flyers, promoting benefits for participants (knowledge transfer, VE certificates, ECTS credits), integration into university curricula and academic programs.

In current phase, we have under preparation advertising material, which are discussed in monthly meetings with al WP leaders and SAB and EAB members

Integration and amount of ECTS credits are under discussion between all members´ universities, and the certificate is under preparation. (see attached draft for 1 ECTS after VE week)

In this guide will be added the text for the 1st call for students and moderators.

CLUVEX Partners/Universities will organise the Call-for-Virtual-Exchange-Week at the universities.

#3.2. Setting up and opening the online registration web-form for students planning to attend VEs

CLUVEX Partners universities will open the online registration system to CLUVEX VEs program. Current Climate University courses are designed in a way that university students coming from different scientific disciplines can participate. The partners will involve students from the Bachelors, Masters and Doctoral (BSc, MSc, and PhD) Programs at their universities having a great pool of potential students to be involved into CLUVEX VEs.

Size and scope of the CLUVEX partner universities

✓ The University of Helsinki (UH, Finland), 31600 students, runs several relevant Masters / Doctoral programs: The Master's Programme in Atmospheric Sciences (ATM-MP), Master's Programme in Forest Sciences Study, Environmental Change and Global Sustainability (ECGS), Nordic Master Programme in Environmental Changes at Higher Latitudes (EnCHiL), Doctoral Programme in Atmospheric Sciences (ATM-DP).
✓ The University of Copenhagen (UCPH, Denmark), with its overall student body of more than 37000 students, runs the Climate Change, Impacts, Mitigation and Adaptation

	(CCIMA), which is an interdisciplinary MSc programme at UCPH, combining natural and social science approaches to the study of climate change, its causes and effects, how we can deal with it and adapt to it. CCIMA draws on staff from a range of internationally leading research groups and centres at UCPH.
✓	The Odessa State Environmental University (OSENU, Ukraine), with about 1400 students, offers both full-time studies (BSc, MSc and PhD programmes) and distance learning facilities. Within the core field of Earth Sciences, the specialization on Meteorology and Climatology is provided. The relevant MSc programme includes research into the climate system components, issues on climate dynamics and modelling, assessment of the climate change impact on the society and economy, as well as development of adaptive mitigation measures.
✓	The Taras Shevchenko National University of Kyiv (TSNUK, Ukraine) is the main university in Ukraine, a powerful multi-sector diversified educational and research complex. More than 26 thousand students study at the University. Approximately 1645 postgraduate students and 125 PhD students are working for higher qualifications at the University. Within the field of Earth Sciences, the specialisation on Meteorology is provided at the Meteorology and Climatology Department of Geography Faculty. TSNUK offers BSc and MSc programmes on Meteorology and PhD programme in the field of Earth Sciences (with Meteorology and Climatology specialisation). The courses related to weather, climate and climate change issues are also studied by students of different specialties of the Faculty of Geography, as well as students of the Institute of Biology and Medicine of TSNUK. Among the main areas of the research of the department's staff are climate change, climate change impact on water resources, economic meteorology, economy of climate change, climatology of heat waves and tropical nights, simulation of urban climate and human thermal comfort conditions, air pollution, which are extremely relevant nowadays.
✓	The Yerevan State University (YSU, Armenia) has about 20000 students studying at 19 faculties of YSU. The educational process is conducted by more than 1600 highly qualified specialists and experts (207 professors, 581 associate professors, 375 assistants, 453 lecturers). Climate change education at YSU may take the form of both formal, informal, and non-formal learning and teaching approaches, including nature-immersive field projects, international case studies and higher degree research, among others. Literary analysis of university education on climate change and sustainability has reflected a gradual shift globally over the past decade away from a narrow preoccupation in curricula on environmental protection toward broader objectives and creative educational approaches. These initiatives include corporate social responsibility, multiculturality and ethics.

To ensure that the critical number of students will be involved with the VE training the partner universities distribute the Call to their national as well as international networks

Examples of the networks to be used to invited to distribute the Call-for-Virtual-Exchange

● Climate University network in Finland consists of the following higher education institutions: University of Helsinki (lead), Aalto University, Haaga-Helia University of Applied

Sciences, Häme University of Applied Sciences, University of Eastern Finland, University of Jyväskylä, LAB University of Applied Sciences, University of Lapland, LUT University, Laurea University of Applied Sciences, Metropolia University of Applied Sciences, University of Oulu, Hanken School of Economics, University of Arts Helsinki, Tampere University, Turku University of Applied Sciences, University of Turku and University of Vaasa. These institutions have a cross-study agreement to enable students to take Climate University courses from each others' curricula.

● UNA Europa, https://www.una-europa.eu, One of the forerunners in renewing European universities, Una Europa is made up of 11 leading European universities who 'share a new vision for the university of the future'. In addition to UH, Una Europa includes Freie Universität Berlin, Università di Bologna, University College Dublin, University of Edinburgh, Universiteit Leiden, Jagiellonian University i Krakow, KU Leuven University, Universidad Complutense de Madrid, Université Paris 1 Panthéon-Sorbonne, Universität Zürich. UH leads a pilot work on Micro-Qualification in Sustainability, consisting of MOOCs and other formats of online teaching to be available for Una Europa students since Autumn 2022 and later for everyone (L. Riuttanen). UH will actively promote the virtual exchange and MOOCs into the joint degrees in Una Europa as well as for use by Una Europa partners in their own curricula (INAR-UH as a network partner).

● Nordic University Teachers network Atmosphere-Biosphere Studies (ABS) is a pioneering project in multidisciplinary environmental education covering the aspects of physics, chemistry, meteorology, biology, geosciences, sustainability sciences and environmental anthropology. The education is based on internationally recognized top research. ABS contributes to the Nordic-Baltic cooperation in environmental education, utilises the idea of lifelong learning, enhances student and teacher mobility, and serves as a forum for exchanging experiences and best practices in education.

● UArctic Network of Universities, colleges, research institutes, and other organisations concerned with education and research in and about the North and involving students from 200 universities (INAR-UH a network member).

● Black Sea Universities Network (BSUN) This network (bsun.org) includes more than 120 member universities from the 12 member states of the Black Sea Economic Cooperation Organization as Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Turkey, Ukraine, and Serbia. BSUN has the status of Sectoral Dialogue Partner to Black Sea Economic Cooperation (BSEC), is in close cooperation with the Parliamentary Assembly of the Black Sea Economic Cooperation (PABSEC), is a member of the European University Association (EUA), and is a founding member of the UN "Academic Impact" Initiative. BSUN has signed collaborative agreements and collaborates closely with the Eurasia Universities Association, the Caspian Universities Association, the Baltic Sea Cooperation Program, and the Mediterranean network of schools of engineering (RMEI). BSUN also signed a strategic partnership with ENEA from Italy to cooperate in developing joint activities in education and research on the green economy, sustainable development, and renewable energy sources. (OSENU is a network member).

● INTENSE International Doctoral School Network consists of academic institutions from Ukraine, Mongolia and Vietnam (intense.network/intense-school/intense-international) and is supported by INTENSE e-services (http://intense.network/e-services). Such activities, as joint

co-supervision, physical and credit mobility, joint research, joint events, and prioritised partnerships are envisioned in the INTENSE network. (OSENU is a founding member).
● ACCC: Finnish Flagship "Atmosphere and Climate Competence Center (https://www.acccflagship.fi) consists of UH, Tampere University, University of Eastern Finland and the Finnish Meteorological Institute. ACCC works to address two of the most urgent global Grand Challenges: climate change and deteriorating air quality. ACCC brings together the top-level science of the research partners and the needs and expertise of key stakeholders to co-create knowledge-based solutions. Mission is to contribute toward achieving carbon neutrality in Finland, EU and global societies, as well contribute to mitigate air pollution to sustain a healthy atmosphere. ACCC contributes to the solutions that help businesses reach the Paris climate targets, to mitigate and adapt to climate change, and thus support the EU Green Deal commitments and the UN Sustainable Development Goals (SDGs).
● CRiceS. Networking community of the Horizon 2020 project "Climate Relevant interactions and feedbacks: the key role of sea ice and Snow in the polar and global climate system" (https://www.crices-h2020.eu). Project focuses on improving model predictions of the role of polar processes in the climate system that consists of the oceans, ice and snow cover, and the atmosphere. The CRiceS project brings together 20 international research teams, from Europe, Canada, South Africa, and India, at the forefront of polar and global climate research. The CRiceS research project aims to enhance the modelling of the impacts that these regions have for the global climate.
● FOCI. Networking community of the Horizon Europe project "Non-Co2 Forcers and Their Climate, Weather, Air Quality and Health Impacts" (https://www.project-foci.eu). FOCI develops new regionally tuned scenarios based on improved emissions to assess the effects of non-CO2 forcers. Mutual interactions of the results and climate services producers and other end-users will provide feedbacks for the specific scenarios preparation and potential application to support the decision making, including climate policy.
● Finnish Atmospheric Science Network (FASN)
● Fudan University & its Nordic Center (Shanghai, China)
● Swiss School for International Studies (Geneva, Switzerland)

#3.3. Setting up principles, criteria and procedure of students´ selection for VE, e.g. gender balance, promoting diversity, inclusivity, equality and equity

The procedure to select students for VEs is oriented to quality and successful VE fulfilment. Students' selection involves evaluation of basic knowledge, skills, and motivation. The process includes:

✓ gender balance ✓ discipline diversity ✓ inclusivity ✓ equality ✓ equity.

Definitions:

> ✓ **gender balance**, both males and females will have equal opportunities to participate in educational VEs and to access new knowledge transfer
> ✓ **diversity**, students with different backgrounds, identities and experiences will be recognized, respected, and welcomed to participate in VEs
> ✓ **inclusivity**, students will be encouraged to retain their uniqueness, and have a sense of belonging and being valued
> ✓ **equality**, students will be treated the same, treated fairly and having the same opportunities
> ✓ eq**uity**, students with varying types or levels of support might be required, depending on individual need, will take full advantage of equal opportunities.

#3.4. Integration of the credits into curricula at the participating universities

Tentative plan is that the student would need to participate, in a minimum to 2, Climate University - VE-enhanced courses and pass the course assessment successfully.

University of Helsinki is, in any case, able to provide the credits as a separate Virtual exchange diploma and 1 credit point. Aall the participating students will register themselves to the Helsinki university system for the credits for the student. The credit in the curriculum for the student outside University of Helsinki will be implemented by the students' home universities.

The Climate University MOOC credits are varying from 2 to 5 ECTS. The Bologna declaration, ratified also in Neighbourhood East countries in 2003, the partners develop curricula in line with the European standards and norms, providing students with opportunities of academic mobility and issuing European Diploma Supplement and ECTS Transcript of Records

#3.5. Organization of the certificate (in addition to credits) for all the students who participated the VE

Students (BSc, MSc, PhD, PostDocs) who participated in CLUVEX VE Weeks and became the Climate Messengers will get the "CLIMATE MESSENGER CERTIFICATE". The certificate will include information about the competencies on learning outcomes and obtained skills. Record about such certificate can be included in students' personal CVs.
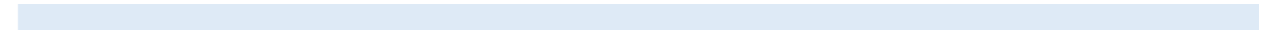
#4. Moderators

#4.1. Organization of the Call-for-Moderators

In planning of VEs we have to consider also the challenges in recruitment of potential moderators/ facilitators among teachers, lecturers, researchers, and students as well as challenges in designing VE content, required tools and timing.

We outlined the following items to consider for Calls:

- ✓ Volunteers in member´s university staffs and students are welcome to become moderators
- ✓ Students, members of CLUVEX SAB, can also be as moderators
- ✓ Student moderators will be granted 2 credits (motivation)
- ✓ Moderators will get certificate including info on working hours, competencies developed, and skills obtained (motivation)
- ✓ Dealing with motivation to get certificate and credits vs. not interested to be involved vs. required workload
- ✓ Dealing with online teamwork on educational e-platform as useful experience for the future
- ✓ Ensuring ethical and responsible behaviour, when working online
- ✓ Handling conflicts and issues effectively

Example of a Call-for-moderators (e-mail)

Join Us as a Moderator for the Virtual Exchange Group Project!

University of Helsinki Institute for Atmospheric and earth System Research INAR is leading the "Climate-University-for-virtual-exchange" ERASMUS+ project, set to run from 2023 to 2026. This project aims to foster collaboration and interaction between students, even if they are located far apart. Our partners in this initiative include the University of Copenhagen, Odessa State Environmental University, Taras Shevchenko National University of Kyiv, and Yerevan State University. Notably, we are also committed to supporting Ukrainian university students, especially in times of war.

As part of this project, we organize international workshops on Zoom for students, focusing on topics related to climate change and sustainable development. Workshops will be held over one week once per semester. Currently, we are in search of moderators for remote working groups. Moderators will guide discussions in smaller groups and help facilitate active student participation. These group discussions will be conducted in English.

We welcome both postgraduate students and researchers from various academic backgrounds to apply as moderators. If you are for example in teacher education, we can also provide a work training certificate. We will stay in touch with all registered moderators and plan to hold a brief one-day training session in the spring of 2024. During this training, you will gain familiarity with Climate University courses and the virtual exchange concept. Our aim is to have at least some of the students who participate in the virtual exchange to join Climate University's distance learning course. So, join us in this exciting endeavor!

You can register at this link: xxxxxxxxxxxxxxxxxxxxxxxxx

More information:

NAMES xxxxxxxxxxxxxxxxxxxxxxxxxxxxx

#4.2. Education of moderators

Education of moderators for VEs including the technical skills (Zoom, DigiCampus, Flinga), soft skills like handling challenges and conflicts effectively and contented, e.g., group exercise based issues; ensuring ethical and responsible behaviour online.

Moderators' education program includes 5 VE trainings (TR) hosted by UH
2-3 hours per topic:

– **TR1: CLUVEX concept & Technical skills**:
– *>>CLUVEX concept - give overview on VE concept and CLUVEX project; & use different planforms*
– *>> Zoom - how to use for group working*
– *>> Flinga https://flinga.fi - learn to use this platform in Zoom sessions for group work*
– *>> DigiCampus https://digicampus.fi*
– **TR2: Climate University (CU) MOOCs:** introduction to CU online courses, to provide basic knowledge on CU that moderators can encourage VE students after completing VE Weeks to participate in CU MOOCs.
– **TR3: Soft skills:** introduction to soft skills, how moderators can support multicultural group working; language barriers and supporting software; other plans and instructions for the moderators carrying out the VE-enhanced education and discussions.
– **TR4: CLUVEX handbooks & materials**: introduction to CLUVEX materials, which will be provided to students as pre-materials (handbooks, other materials, webpages, etc.) before participating in VE Weeks.
– **TR5: CLUVEX exercise for VE Weeks**: introduction to CLUVEX group work / exercise; feedback & questions & discussion between the trained moderators and educators.

#5. Technical e-setups

#.5.1. Selecting and organization of the e-platform and e-tools

Selecting appropriate technology platforms

✓ Zoom
✓ Flinga
✓ DigiCampus, a shared learning environment for universities, courses (www.digicampus.fi). At the moment courses include independent learning at the online platform, but also teacher interaction and group work.
✓ English language skills of the participating students from Neighbourhood East countries might be a limiting barrier for communication, and hence, it is especially important to find new technological solutions, in this case, translatorsto help students in their virtual communication.

#5.2. Selecting approaches and technical tools to overcome language barriers.

The principles, criteria and procedure of technical tools' selection will be elaborated by the consortium in the CLUVEX VE Guidebook. The project Steering Group will select the students to courses and ensure the diversity, non-discrimination of participants and all other relevant aspects (as the number of students indicated in the proposal per university) are in balance.

Some level of English language proficiency will be required to participate in VEs, but participants will also be introduced to online translating tools such as

> ✓ MS Translator https://translator.microsoft.com
> ✓ Google translate https://translate.google.com
> ✓ Google Translator
> ✓ Yandex translate https://translate.yandex.com
> ✓ Youtube translator to work on joint exercises/assignments

Moreover, small group discussions will be formed in a way that every such group, led/coordinated by moderator, has, at least, one student fluent in English and in languages of the CLUVEX Partners from the Neighbourhood East countries.

#5.3. Recruiting technical staff

In addition to moderatos, there is a need to have during VE Weeks, at least, 2-4 technical staff persons who are well familiar with required software and e-platforms, and who will ensure in 2 "parallel timelines" stable technical connection and communication during the VE.

#6. Evaluation, assessment, studying and developing the VE concept

#6.1. Gathering feedback from the participated moderators and students

) Text pending: OSENU (contact Valeriay Ovcharuk & Oleg Shablii) has experience within Erasmus+ ClimEd project on gavering feeback & it can be added here: on gathering feedback from the participated students and teachers.

#6.2. Study the learning outcomes with different methods

) Text pending : Note: OSENU (contact Valeriay Ovcharuk & Oleg Shablii) has experience within Erasmus+ ClimEd project on learning   outcomes and obtained skills & it can be added here: on studying the learning outcomes with different methods (e.g., questionnaires   , interviews, etc.).

#6.3. Using assessment data for program improvement

*) text pending. Assessed data/results will be used for further program improvement of VEs (e.g., including updating CLUVEX developed VEG, CLG, and CMC, publishing peer-reviewed articles).

Note: OSENU (contact Valeriay Ovcharuk & Oleg Shablii) has experience within Erasmus+ ClimEd project & it can be added here: on using assessment data from ClimEd 3 online trainings.

#7. Science communication and scaling up

#7.1. Effective communication tools

The CILVEX project has established public website (https://www.atm.helsinki.fi/cluvex), where the project relevant information is available including news (Figure 4a), partners, collaborators, materials (Figure 4b), etc. The announcement of the Call-for-VE-Week for students will be published at the CLUVEX project official website (hosted by UH) in English, as well as at the Partners' websites in national languages (Ukrainian and Armenian). Such announcements will be also distributed through students' local networks in universities as well as through network of the Bioart Society. Moreover, announcements will be distributed through national and international networks mentioned in the sections 2.2.3.2 and 2.2.7.2.

(a)   (b)

Figure 4: *CLUVEX project (a) website with main webpage presenting recent news in a chronological order, and (b) promotional poster targeted for students to join VE Weeks.*

#7.2. Strategies for scaling up VE concept

Previous collaboration of the CLUVEX partners UCPH, with World Meteorological Organization's (WMO) Global Campus and regional centers provides a baseline for a global upscaling and the development of an international standard for training of young scientists.

Participating countries Collaboration with WMO and having a representative of the Global Campus as a CLUVEX Advisory Board member enables the conformity of curricula, for example education staff for climate services to international standards and contribute to improvement of the quality of courses to be created.

Also, the CLUVEX Expert Advisory Board (EAB) members represent relevant networks like Universities of Arctic for the future upscaling. The CLUVEX' experience in development of innovations and application of the VE e-learning, which will make it possible for the Neighbourhood East part of the consortium to get acquainted with the most relevant and state-of-the-art developments in distance and blended learning.

Examples of the CLUVEX networks

WMO Network of Regional Training Centers, 43 Regional Training Centres in 28 countries around the world, serving to promote, demonstrate, disseminate and provide outreach of project outcomes worldwide, to countries outside the EU. WMO Regional Training Centers. **WMO Global Campus** (public.wmo.int/en/resources/meteoworld/wmo-global-campus) will also be involved (WMO ETR director is a member of CLUVEX Advisory Board). The PI of the UCPH, as a staff member of WMO, is deeply involved in these WMO network activities. UCPH PI leads this collaboration with regional training centers).
PEEX (www.atm.helsinki.fi/peex). Pan-Eurasian EXperiment is a hub (over 40 research units from many countries worldwide including also Neighbourhood East countries and China) for distributing information, especially The PEEX research is interested in land-atmosphere interactions in the boreal and Arctic environments. Program is also motivated by establishing environmental observation systems, which find synergy with citizen science and education activities of the project (network coordinator UH) (INAR-UH leads).
DBAR (www.dbeltroad.org). Digital Belt and Road Program, China (as a stakeholder), provides a network for education collaboration with Chinese universities. DBAR is coordinated by The Aerospace Information Research Institute (AIR), Chinese Academy of Sciences (CAS), which is a scientific research institute, with more than 2000 researchers and collaborates with UH-INAR. (INAR-UH A DBAR-Center of Excellence).
Copenhagen Science City (copenhagensciencecity.dk) is a partnership between the City of Copenhagen, UCPH and various local governmental and business organisations. It is a home to a wide range of educational programmes in the fields of natural science, medicine, health and ICT. It utilises its unique resources in different fields to create a strong knowledge and innovation community and to attract business talent and investment and increase the number of entrepreneurial students and spinouts.
PACES (pacesproject.org). Air Pollution in the Arctic: Climate, Environment and Societies - International initiative co-sponsored by International Global Atmospheric Chemistry (IGAC), Future Earth & International Arctic Science Committee (IASC). (UH and UCPH are involved).

> **IAMES** (www.iamesworld.com). International Association of Meteorological Education and Sciences was established in December 2020, which was initiated by Nanjing University of Information Science and Technology (NUIST) and supported by more than 30 colleges, universities and scientific research institutions from over 20 countries. IAMES is a non-governmental, non-profit, academic, and scientific organization, dedicated to the international promotion and coordination of scientific studies and education on meteorology (atmospheric science, hydrology, environmental science, and other meteorology-related disciplines). IAMES encourages the application of this knowledge to social needs, such as weather forecasts, climate change, mitigation of natural hazards, and environmental preservation. IAMES is established to stimulate meteorological education and research, promote scientific and technological innovation, share high-quality platform resources, provide government policy consultation, and enhance the coordination ability to respond to major scientific issues (OSENU is an Associate member).

> **INTENSE** (intense.network/intense-school/intense-international). International Doctoral School Network has been established on 7 Nov 2019 by OSENU, Kharkiv National V.N. Karazin University, Institute of the Ecology of the Carpathians NANU, National University of Mongolia, Khovd State University, HoChiMInh City University of Natural Resources and Environment, and Hanoi University of Science and Technology by signing an agreement. Such activities, as joint co-supervision, physical and credit mobility, joint research, joint events, and prioritised partnerships are envisioned in the INTENSE network. The agreement provides for access to e-learning, arrangement for joint research training and a range of other academic activities.

#7.3. Promoting VE outcomes and networking beyond CLUVEX lifetime

Under preparation in 2024-205

#7.4. Ensuring long-term sustainability and institutional support

Under preparation in 2025-2025

#7.5. Fundraising and resource allocation beyond the project lifetime

3. CONLCUSIONS AND RECOMMENDATION FOR VIRTUAL EXHANGE

Once all sections above will be completed -> add the most crucial moments here in 2024-2025 and as a part of upcoming updates of this document.

4. REFERENCES

tba