



Erasmus+

Cooperation for innovation and the exchange of good practices sub-programme

TECHNICAL REPORT form

Programme	Erasmus+
Sub-Programme	Cooperation for innovation and the exchange of good practices
Action	Capacity Building in higher education
Sub-Action	Joint Projects
Call for Proposal	EAC-A03-2018
Project number	610456-EPP-1-2019-1-FR-EPPKA2-CBHE-JP
Agreement/decision number	20192027
Project Title	Latin-american Alliance for Capacity building in Advanced physics

Contractual Data

Dates and Beneficiaries

Dates

Project Start: 15/01/2020	Project End: 14/01/2023
Activities Start:	Activities End:
Project Duration(months): 36	

Beneficiary Data

Role	PIC	Name	Country
Management Contact Person	897691060	UNIVERSITE DE PARIS	France
Co-Beneficiary / Partner	999851169	UNIVERSITE PAUL SABATIER TOULOUSE III	France
Coordinating Organization / Beneficiary	897691060	UNIVERSITE DE PARIS	France
Co-Beneficiary / Partner	933626844	UNIVERSIDAD DE INVESTIGACION DE TECNOLOGIA EXPERIMENTAL YACHAY	Ecuador
Co-Beneficiary / Partner	938699847	UNIVERSIDAD SAN FRANCISCO DE QUITO	Ecuador
Co-Beneficiary / Partner	998504033	UNIVERSIDAD ANTONIO NARINO	Colombia
Co-Beneficiary / Partner	997938038	UNIVERSIDAD INDUSTRIAL DE SANTANDER	Colombia
Co-Beneficiary / Partner	994707938	UNIVERSIDAD NACIONAL DE INGENIERIA	Peru
Co-Beneficiary / Partner	999453081	UNIVERSIDAD NACIONAL MAYOR DE SAN MARCOS	Peru
Co-Beneficiary / Partner	997939590	UNIVERSIDAD SIMON BOLIVAR	Venezuela
Co-Beneficiary / Partner	998697257	UNIVERSIDAD CENTRAL DE VENEZUELA	Venezuela
Co-Beneficiary / Partner	999897729	TECHNISCHE UNIVERSITAET DRESDEN	Germany

Legal Representative

Organisation Legal Address

Name: UNIVERSITE DE PARIS

Street: 85 BD SAINT GERMAIN
Post Code: 75006 City: PARIS
Country: France

Department

Name:
Street: RUE THOMAS MANN 5
Post Code: 75205 City: PARIS
Country: France
Local Address:
Internet site: <https://u-paris.fr/>

Contact

Title: Mme Function: Présidente
Name Christine Last Name: Clerici
Phone Number 1: +33157275510 Phone Number 2:
Fax Number: Mobile Number:
Email: presidente@u-paris.fr

Contact Person

Organisation Legal Address

Name: UNIVERSITE DE PARIS
Street: 85 BD SAINT GERMAIN
Post Code: 75006 City: PARIS
Country: France

Department

Name: CAMPUS GRANDS MOULINS
Street: 4 Rue Elsa Morante
Post Code: 75013 City: PARIS
Country: France
Local Address:
Internet site: <https://u-paris.fr/>

Contact

Title:

Name: Jose

Phone Number 1:

Fax Number:

Email: ocariz@lpnhe.in2p3.fr

Function:

Last Name: OCARIZ

Phone Number 2:

Mobile Number:

Draft

Project Summary and Horizontal Issues

Project Description

English - 1	<p>The primary objective of the Latin-American Alliance for Capacity building in Advanced physics (LA-CoNGA physics) is to modernize the educational platform, using advanced physics as a model, in eight Latin-American higher education institutions (HEI) from Colombia, Ecuador, Peru, Venezuela.</p> <p>The proposed modernization is based on the development of an innovative syllabus, a learning atmosphere using standard research environment tools and a planned sustainability strategy. Following the Bologna model, we offer a one-year Master's syllabus oriented to problem-solving. The courses are inserted within the local Master's program of each target institution, and are intended to strengthen the cross-institutional relations among the target HEI's. The LA-CoNGA physics syllabus is a blend of three fundamental modules: Theory, Data Science and Scientific Instrumentation. The Theory module presents a framework for Advanced Physics concepts. Simultaneously, The Data Science and Scientific Instrumentation modules provide basic techniques and skills used in (and outside) the professional physics career. Two optional courses and a three-month internship complement the introductory courses, expanding the vision on applying the concepts and techniques discussed in the three modules.</p> <p>The learning environment relies on a e-platform developed based on standard open-access tools commonly available for research collaborations in High Energy Physics and Astrophysics. These tools favour the replicability of the scientific process, by sharing the data and codes associated with creating knowledge. Finally, remote instrumentation and interconnected laboratories complete this real-life operational research environment.</p> <p>The LA-CoNGA learning suite integrates a Git repository for version control of source codes and documents, a data repository to preserve and give access to samples from instrumental measurements and computer-generated data, and also includes an instant messaging tool and a computational interface. The instant messaging system organizes and stores team discussions. The computational interface allows the users to process and analyze data from the repository or directly from an instrument. All codes and generated data, saved into git and/or data repositories, can be shared among users.</p> <p>The sustainability strategy aims to establish academic interrelations among the consortium stakeholders outside the scholarly activities related to the LA-CoNGA physics syllabus. The project promotes joint seminars among the different Master's programs and cooperation among the international relations offices to generate common quality assurance indicators and share the educational resources produced by the project.</p> <p>A code of conduct, a diversity policy and an open data plan are three crucial ingredients of our vision for capacity building in the region. Their needs and implementation strategies are implemented by the consortium, and discussed with the LA-CoNGA physics students and the international relations offices of the partner HEIs.</p>
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Horizontal Issues

Previous recommendations/follow-up

We address here a selected list of items from the referee's assessment of the application.

"The target group justification is less convincing for administrative staff"

As a rule, we assume that each HEI partner contributes to the program's co-financing and implementation with human resources from their administrative staff. The main exception is the Project Manager (PM) at Université de Paris, 100% devoted to the project, hired with our Staff Costs budget.

"other international sources of funding have not been considered"

As part of our effort to ensure the project's future, we are exploring several sources of funding in support of our activities. We for example received a grant from CS&S in support of our citizen science and hackathon activities (see WP5).

"Staff costs have been allocated to teachers and this is not coherent with the project design"

This is a fair criticism. Some replies:

- 1) the dominant Staff Cost is allocated to hiring our PM
- 2) the budget includes contracting of local technical staff at UIS and USFQ
- 3) as already mentioned (and also by the referee), our partners contribute to the co-financing via significant allocation of local human resources
- 4) most importantly, the Staff Costs budget does not reflect the number of hours our colleagues are devoting to the project

"The option to fund international internships for students generates large expenses"

This is a concern that we share. In view of the project's future sustainability, we plan to mitigate this weakness by strengthening the student mobilities within our network, via existing and new cooperation agreements.

"the number of staff involved is rather low [...] this is a clear drawback of this proposal"

This is a very fair criticism. As already mentioned, the actual number of colleagues actively involved in the project has increased significantly. The actual number of work hours by our colleagues largely exceeds the amounts covered by the current Staff Costs budget.

"Although there will be regular meetings, other communication means are not explicitly indicated"

We consider that this has not been an issue. Our project inherits from usual practices in the HEP community, where the habit of frequent remote meetings and communication is well established. The consortium meets once a week, with representatives from all partners. The coordination team meets at least 2 or 3 times per week. We meet our communication team at least once per month. We have teacher-students meetings twice per month, devoted to monitoring the students' activities.

On top of that, we have organised a number of bilateral meetings with high representatives from each HEI, and two larger meetings with the ensemble of administrative and academic staff from all partners.

"The overall sustainability is not convincing in aspects related to the maintenance and renewal of [...] equipment"

The most specific equipment is the CAEN Nuclear Physics kits. CAEN is also an Industrial partner in the project, and the purchase includes a full 3-year warranty. But indeed in the longer term this concern will become more of an issue; we expect the renewal of the equipment will be secured via local sources of funding or future international programs.

"the potential re-accreditation has not been addressed and may impede continuity of the courses"

This important concern is at the core of our ongoing effort to ensure the project's long-term sustainability. At this stage, all our partners are strongly committed to keeping the LA-CoNGA physics courses inserted in their local Master's. In the longer term, we intend to work towards a complete, official co-accreditation of a LA-CoNGA physics Master's diploma, common to all our partner HEIs.

Transversal issues

Most of the partner HEIs are public institutions (except UAN and USFQ). The enrolled students show a diverse socio-economic background, a part of which are low-income students. Initial demographic surveys¹ show that during the first year of courses we had: 32% female participation, age ranged between 18 and 35 years old, very diverse family setup conditions and 19% of students had access to a limited or erratic internet connection.

Therefore, equity of access and inclusion were the two main pillars in the design of our diversity plan (2). We have implemented mainly four strategies to improve equity of access: first, the e-learning platform is available for all members of the HEIs community and even beyond as we are working together with our partner redCLARA in the generalisation of the platform for other institutions and fields. Second, our educational content is open (3) and available asynchronously, as defined in our Data Management Plan (4). Third, since we have students with very different family setup and 30% of them are working either full or partial time we use asynchronous tool for classes like YouTube and for communication (Mattermost) and implemented a mentoring program where each LA-CoNGA physics teacher is paired with 2-3 students to follow their community experience and provide advice when needed. Four, we have used social media as well as general mailing lists in the partner countries HEIs when recruiting students and promoting our activities, to ensure a wide call. In addition, we have created a community code of conduct clarifying our mission, values and principles, linking them with standards of professional conduct and clarifying available resources related to ethics within LA-CoNGA physics.

In terms of gender balance and diversity, we have promoted the presence of highly qualified women giving the courses and seminars to serve as role models for the students (30% female representation during the first year). We have joined the Gender Equality Network in Physics in the European Research Area (GENERA). The interaction within the GENERA network was important to define our diversity plans and have provided resources for equality and diversity-awareness within the LA-CoNGA physics community. Our Equality, Diversity and Integration Officer (EO) has been a key figure in these activities, monitoring the openness and inclusiveness of our activities, resources and services.

The remote-presence nature of LA-CoNGA physics contributes to the equity of access, sustainability and to the challenges imposed by the unexpected COVID pandemic. The e-learning modality and remote instrumentation laboratories are well adapted to the realities of Latin-American countries: low student population in STEM, large territories and not all students concentrated in the cities. All these was aggravated during the COVID pandemic and LA-CoNGA physics was able to offer immediate solutions to the challenges imposed by COVID to the partner countries HEIs. Increasing the number of students is also easily handled under these remote-presence conditions which is important for the sustainability of the project and increasing our capacity to reach and impact more people.

(1) Reports from the Diversity Officer: <https://github.com/LA-CoNGA/WP5-Dissemination/tree/master/DiversityPlan/Reports/Diversity-Reports>

(2) Diversity Plan: https://github.com/LA-CoNGA/WP5-Dissemination/blob/master/DiversityPlan/LA_CoNGA_Plan_de_diversidad.pdf

(3) LA-CoNGA physics courses: <https://laconga.redclara.net/courses/>

(4) Data Management Plan: <https://github.com/LA-CoNGA/WP5-Dissemination/tree/master/DataManagementPlan>

Involvement of people with fewer opportunities

(c.f. responses in the "Transversal Issues" field)

Award Criteria

Assessment Criteria

Relevance of the project

Relevance to the objectives

The LA-CoNGA physics consortium has maintained its general objectives, which remain relevant despite the pandemic context and the difficulties stemming from the very recent creation of Université de Paris, our coordinating Institute. These two collateral situations have strongly impacted the general management of the project. However, the consortium has adapted to the context and managed to confirm the initial objectives of Capacity Building with partner countries.

The particular national context faced by our two Venezuelan partners, UCV and USB, required some specific management procedures to address delays and difficulties. Yet this situation has not changed the essential commitment and participation of these two partners.

Also in Ecuador, our partner Yachay Tech has faced various governance problems. Being the youngest partner (created in 2014), this institution is still adapting its structure. The Ecuadorian political context has translated into various short-lived changes in Yachay Tech's management. The participation and mediation of the EACEA Erasmus+ Ecuador representative, has been very helpful in keeping Yachay Tech's commitments with LA-CoNGA physics.

Concerning the LA-CoNGA physics courses, they were initially scheduled to follow a blended, semi-presential learning format, according to the initial proposal. The strict lockdowns forced by the pandemic situation required us to move to a fully-remote format, in order to reach the students who all had to connect from their homes.

Another large difficulty, that has overall caused impact in the project and needs regular follow-up, has originated in some level of underestimation of human resources in the original proposal.

The initial proposal estimated small amounts of subcontracting costs for technical activities. However, the development of the e-learning platform quickly showed the need for an increase in technical person power. Moreover, the project had to hire an external Communication Consulting Team to be professionally in charge of the project's dissemination and communication strategy. This team works regularly with the WP5 coordination.

In summary, the project needs to continue hiring local specialists and technicians to keep up with the evolution of LA-CoNGA physics.

EU Education, Cooperation & Development policies

The project is fully aligned with the EU higher education objectives as highlighted in the assessment of the original project. Globally, LA-CoNGA physics is aligned with three out of 17 Sustainable Development Goals (SDGs) that the United Nations (UN) adopted for the 2030 agenda and are also adopted by the EU. LA-CoNGA physics encourages innovation and increases in the number of research and development workers in developing countries, which is one of the targets of SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation). We also provide equal access education using e-learning; training for students in developing countries for information and communications technology, technical, engineering and scientific programmes, and increase the supply of qualified teachers which are targets of SDG4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). We also promote gender equality in STEM which is the target of SDG5.

LA-CoNGA physics contributes to disseminate EU higher education policies and tools in the partner countries HEIs. For example, our one year Master's program is modelled using the EU requirements of 60 ECTS, showing the advantages to adequacy into a program in the lines of the EU Bologna Model. Administrative staff are gaining experience in managing EU projects and the EU Bologna system. We have started discussions within the different participant HEIs and representatives of UNESCO-IESALC about the importance of cooperation agreements and diploma recognition among institutions for the sustainability of these efforts.

LA-CoNGA physics has created strong synergies with other EU funded projects like the Gender Equality Network in Physics in the European Research Area (GENERA network) and RedCLARA for the creation of the e-learning platform. In particular with RedCLARA we are working in a project called miLAB that will update our current e-learning platform to an application giving access to validated open source publications and data and with the possibility of creating online work groups, to strengthen collaboration and the use of high quality information in research and academic instances.

The project has also attracted the attention of EACEA - Erasmus+ offices in Colombia, Ecuador and Peru.

Quality of the project implementation

Description of the implemented activities

All activities reported are in the tables of achieved and planned results. Most of them are in line with the project's original proposal with the active participation of the partners. The primary issue that has been faced arises from the continuous strict lockdowns implemented in the target countries. They forced us to cancel all mobilities and led us to organize all meetings and institutional contacts through videoconferencing. They also generated significant obstructions in administrative procedures, thus generating delays in contracting and purchasing processes. These barriers have been impacting the evolution of the whole project. Additionally, the impossibility for our students to access the campus infrastructures imposed severe restrictions on the students' communications in the different courses. For many students, the internet connections from homes are precarious and primarily executed through cell phones.

The courses have been included in six of the eight Master's programs. For some universities, this involved a significant change in their existing programs, updating and reforming their syllabus to include the new areas like Data Science and Instrumentation offered by LA-CoNGA physics. These courses have profited from the participation of more than two dozen lecturers, that have provided the students with a broad spectrum of visions and projects.

The discussions concerning the code of conduct and the diversity/equity plan within the project have been necessary. Comparing different institutional approaches has also been very fruitful to unite the LA-CoNGA physics community around these inclusion principles.

The learning environment developed in-house for the consortium, made of professional open-source tools, is now considered a candidate to be a stand-alone platform to help small and medium research groups operate. This environment trains our students to work in actual research conditions and enables the consortium to perform daily interactions among our members.

We have produced a proof of concept by installing and operating remote equipment to develop physics lab projects under the low bandwidth required to perform these projects from home connections. These implementations are now fully operational as a contribution of one of the partner institutions.

The pandemia changed all our pedagogical strategies. The planned model was an eight-node network of universities assuming local groups for discussions and interactions. The instructor will help support the course evaluation of local students and cooperate with the evaluation of the other institutions. The university e-infrastructure guarantees good connectivity among the nodes and supports the remote operation of lab equipment. The house lockdown changed, and low-quality home connections mediated all the interactions among the students, classes and the lab infrastructure. We simplified the connectivity requirements to a minimum bandwidth that could operate the remote equipment. We have also been forced to change the model of interaction and evaluation, balancing the teamwork on course projects and continuous evaluation based on class exercises.

We are facing significant administrative difficulties with three of our stakeholders:

The "new" Université de Paris, emerging from the administrative fusion of Université Paris Diderot and Université Paris Descartes, has hindered the purchasing and contracting process.

One of our target partners, Yachay Tech, has suffered from frequent changes of higher authorities due to recent changes in policy in Ecuador. Universidad Central de Venezuela and Universidad Simón Bolívar are facing severe difficulties due to the political situation of Venezuela.

Quality assurance

The quality assurance measures are of two kinds: internal and external. Each has different purposes:

To warrant the adequate academic level and feasibility of the syllabus.

To evaluate the quality and ease of use of the e-learning platform

To guarantee that the courses are well designed and calibrated to ensure the follow-up of student careers.

Internal quality assurance has three complementary means:

Online surveys for the students

To evaluate the lecture quality, level, rhythm, and the proposed courses' coherence.

to estimate the amount of work required to follow the courses, the quality of the material and computing facilities available

to identify the opportunities to communicate with the staff and other students

to recognize the accessible information about the program, a student evaluation for the courses,

The staff analyzed the survey results during the weekly consortium meetings following the end of the 1st semester.

Permanent student mentorship. Each student has a mentor helping the student through her/his personal and academic trajectory in the LA-CoNGA physics program. Each mentor first contacts the student by email, and then it follows a conversation by Skype or Zoom in the middle of the first semester. In these spaces, the students could comment on any problem or difficulty they encountered in the program.

Online surveys to the academic and technical staff covering issues about the level of the students with the one of the courses, the regularity in attendance and participation, the computing and technical facilities, the usefulness for members of the staff to obtain the required information, technical assistance and the global pedagogical coherence of the designed program.

The questions of the surveys were decided among the members of the academic and administrative staff. We produced a report based on both surveys, and for details, we refer the interested reader to the details. The overall outcome from both surveys is highly favourable in all the aspects mentioned above.

We implement the external quality assurance by two complementary elements:

An external advisory board with very prestigious and internationally recognized scientists asked them to evaluate the courses & program's coherence, feasibility, and pertinence of the courses & program. The list of personalities of our external advisory board is in:

<https://laconga.redclara.net/quienes-somos/> .

A survey to advisors external to the program to evaluate the quality of the education received and the student's capacity to get into a PhD program or occupy a job in an industrial market. The outcome of this survey is essential for the academic staff to make sure that the courses are well designed and calibrated to ensure to students the best opportunities in the follow up of their careers.

The COVID lockdowns profoundly impacted our mobility activities. Students that were supposed to travel for their training courses had to cancel their trip. We plan to set up for the next year an online survey explicitly addressing mobility activities.

Visibility

LA-CoNGA physics' visibility is guided by our Communication Plan (cf. Table WP5) created with our communication team with the following objectives: make visible the project's mission, vision and values; communicate progresses and raise awareness about the scientific areas covered by the project. Different channels and strategies were designed depending on the public: the consortium team; students; authorities, administrative bodies and the scientific community of the partner higher education institutions and other HEIs in the region as well as national authorities and policy makers.

The main communication channels used are:

Website (cf. Table WP5). Five sections can be identified: the first one with static information regarding our objectives, our tools, the team and our policies regarding content sharing, diversity and communication. A second one called "how is it going" with links to press releases and videos documenting our progress. A third one called "Academic offer" linking to the e-learning platform, the space designed for students is in itself a form of communication. Courses content and academic activities are open access and transparent in such a way that the experience of the work proposed in the training in advanced physics is made visible. The fourth one is where news and events like our bi-weekly seminars are promoted and finally a "contact us" section links to RRSS, YouTube channel and email. Our website' Spanish version is regularly updated by our communication team and the English version is work in progress.

Social networks: LA-CoNGA physics is present on Facebook, Twitter, Instagram and YouTube. As of September 12th, 2021, the statistics on number of followers are: 458 in YouTube, 571 in Facebook, 403 in Instagram and 375 in Twitter. We have launched 3 main social media campaigns: #LACoNGAphysicsAfina (around 30 posts in the form of videos, animated GIFs, images, URL links, as well as conversation threads and around 2000 impressions per publication in each RRSS) which documented the e-learning platform development as well as the organisation and collaborative effort during 2020; #queremosSerMas (5 publications generating with a peak of 4.288 impressions) during the International Day of the Women and Girls in Science 2021; #AuLACoNGA (around 120 posts and 80k impressions accumulated during the first semester of 2021) summarising the first years of courses. (cf. Table WP5 for the communication team's reports)

Traditional media: several press releases have been released and distributed to the communication offices of the different partner HEIs. They are available in our website, posted in RRSS and a list of links showing the partners sharing the information in their websites is available in Table WP5.

The consortium has also created a GitHub project that is used as a repository for sharing documents and information. This repository is mostly open access, with protections to respect privacy of personal information. This report often contains direct links to one single file or a full directory within our GitHub project (c.f Table WP5).

Three main webinar cycles took place in the last year and a half: Hablemos LA-CoNGA (Let's talk about LA-CoNGA), One year in LA-CoNGA physics, Seminars LA-CoNGA physics (cf. Table WP5 T5.6 for more information and our youtube channel for the videos).

Regarding our participation in workshops and conferences, please see Table WP5 T5.6.

All these examples, tools and events provide examples of compliance for visibility, exploitation and publicity obligations described in the grant agreement (art. I.10.8 and I.10.9).

Equipment

As has been mentioned above, in addition to the global sanitary situation, we have faced severe administrative difficulties that affected the purchase capability of the consortium. Most of the equipment needed for our project is very specific and is provided only by a few manufacturers. These are in particular instruments for Nuclear and Particle Physics laboratories. To purchase them, Université de Paris went through a complex tender process, which finally concluded by end June 2021. We expect to receive this material around mid-October 2021 and start its installation at seven sites of our institutional network. Different instruments will be installed in Colombia (UIS and UAN), Ecuador (Yachay Tech and USFQ) and Perú (UNI and UNMSM). These lab equipment will be interconnected and shared through our university network, and will provide new possibilities to include extra lab experiences in our curriculum.

All this adverse panorama resulted in the acquisition/installation of very little equipment to support our courses' first edition of 2021. They were general appliances, computers and basic electronics modules installed in Colombia (UIS and UAN) and Perú (UNI-UNMSM) institutions. Ecuador has stringent regulations to import electrical equipment, so we had to change the models to comply with these regulations. The purchase of this equipment for Ecuador institutions is in process. Venezuela has a precarious economic situation. The administrative rules at Université de Paris have made it impossible to deal with the local Venezuelan providers to obtain the equipment for UCV and USB partners.

Despite this unfavourable scenario, we managed to support the needs of our instrumentation and computing courses based on the contribution and enthusiasm of our partners. Universidad Industrial de Santander provided video conferencing resources for all the online classes for our 67 students from 10 institutions in four countries.

We implemented remote laboratory setups based on detectors available in Bucaramanga, Colombia. From Universidad Industrial de Santander, we allowed the students to perform online remote measurements on two particular experiences. A local technical staff configured and maintained the functioning detectors, and 17 students connected could remotely operate the sensors and collect the data.

Computational resources, provided by our partner RedCLARA in cooperation with CEDIA (the Ecuador Academic Network), supported the needs of 25 students for the data science and theory courses. These resources were used not only for coding and computing but also to ensure day-to-day interaction with our academic community and for course content management.

Our original plan envisioned the training of students, locally connected using the network resources available at their university campuses. All our students and most of our instructors had to operate from their homes during the lockdown periods. From home sites, the information technology infrastructure was often minimal, making it difficult for our students to interact among them and to access the experimental setups. The other unfortunate element was the impossibility to access the institutional laboratories and classrooms. We partially solved this difficulty by creating a library of video resources with recorded classes. The students with connectivity problems could follow the course asynchronously when their connection was reestablished.

The project includes activities relating to curriculum development

Yes

HIGHER EDUCATION: Promoting internationalisation, recognition and mobility, supporting changes in line with Bologna principles and tools.

The Bologna principles provide an opportunity to enhance Capacity Building for Higher Education, and are a tool to foster the development of international academic cooperation. LA-CoNGA physics has designed its pedagogical offer so that it is both matched to the needs and requirements of our partner HEIs, and calibrated to the criteria of the Bologna process, for example by using the ECTS as credit unit.

Our partner HEIs have integrated the LA-CoNGA physics courses into their pedagogical framework, so that LA-CoNGA physics enriches their already existing Master's Courses. As a general rule, our partner HEIs have been largely positive and open to the required changes. The impact goes beyond the sole sharing of academic material, and concerns a wider range of stakeholders: academic, administrative, technical staff, and the interaction with non-academic industrial partners.

Furthermore, the transversal activities developed within the project, such as the Citizen Science and Hackathon projects, allow a broader participation of younger generation (i.e. high-school students) in civil society initiatives: "for the students, by the students".

Finally, the project development has been aligned since its beginning with the Paris Communiqué principles, calling for:

1) an inclusive and innovative approach to learning and teaching: advocate for Diversity and social inclusion (cf. Diversity Plan, LA-CoNGA physics Mission, Vision, Values). Cross-cultural scientific learning and teaching through blended, semi-presential learning adapted to the new normality.

2) an integrated transnational cooperation in higher education, research and innovation: the LA-CoNGA physics consortium has developed a solid cooperation network that benefits from previous academic/research partnerships, and promotes transnational cooperation actions between administrative staff, by having regular meetings and adapting and sharing experiences about European Management procedures.

3) securing a sustainable future through higher education: LA-CoNGA physics long-term goal is to maintain a sustainable future by improving not only academic partnerships with all the consortium members, but also to promote and integrate the participation of new stakeholders (industrial partners, high-schools, science clubs, providers).

New/updated courses

The LA-CoNGA physics syllabus was developed in its entirety during the preparatory year 2020. It is an innovative, comprehensive approach, designed to match the needs of students that have chosen modern advanced physics as a training path, and to complement the existing curricular offering in the HEI partners participating in the project.

The structure of our syllabus is summarised on <https://laconga.redclara.net/oferta-pedagogica/>, and its most relevant innovative pieces of our syllabus are the following:

A three-track skills training: in our syllabus, Theory, Scientific Instrumentation and Data Science are treated on equal footing. The same number of ECTS is assigned to each track, and this is in clear contrast with traditional syllabi in our target partners, that tend to focus either on Theory for students aiming at pursuing a PhD, or focus on Instrumentation for students aiming at careers on applied topics. And Data Science was until recently not an important part of any syllabus.

A two-flavor training in advanced physics: either on High-Energy physics (HEP) or on Complex Systems (CS). The CS track was not considered in the original proposal, but arose during the preparatory work in 2020, as represents a very important enlargement of the LA-CoNGA physics academic offering, and is a positive reflection of the expertises within the consortium. The two tracks are reflected in each of the three skill tracks via specific courses and hands-on activities. We would like to point out the main course in the Theory track: "Introduction to Field Theory". The structure of this course is an original, innovative approach, with a first 8-week long subcourse common to all students (5 ECTS), split later into two different HEP and CS subcourses, each 8-week long as well (and 5 ECTS each). The common subcourse is built in such a way that it provides a common set of concepts and tools to both HEP and CS students, and provides a common footing for a modern understanding of a large variety of cutting-edge phenomena, i.e. spontaneous symmetry breaking or renormalization group.

A three-stage chronology: The first semester is mostly composed of mandatory courses and hands-on activities, with each track having 10 ECTS assigned. The second semester is split into two pieces: four 8-week-long courses, followed by a 14-week-long research internship. The courses are composed as follows: two are mandatory and common to both HEP and CS ("Advances topics in data science" and "Introduction to Medical Physics"), and one specific to each track ("Astro-particles and Cosmology" for HEP, and "Advanced statistical mechanics" for CS). Each course has 5 ECTS assigned (yielding therefore a total of 15 ECTS per student). The research internship has 15 ECTS assigned, and is structured as follows: an initial pre-internship report to be completed after two weeks (usually a bibliographical survey), the internship work, and finally the production of an internship written report and an oral presentation at the end-of-year School Network.

Describe for each of the partner countries involved, the recognition and accreditation procedures:

Our LA-CoNGA physics project has not committed to achieve an accreditation within the three-year time scale of the program. The LA-CoNGA physics courses are embedded into the already-existing Master programs in physics of each partner University. The recognition of LA-CoNGA physics courses is addressed by each partner University, following its own internal academic procedures. Note that the physics Master at USFQ was just recently created, and is intended to be created in 2022 for Yachay Tech, with 1 year delay with respect to the original plan.

No

Teaching / Training Activities

Yes

Mobility for Teaching, Training and/or project research activities

Teaching activities : the LA-CoNGA physics courses, provided by the academic staff involved in the project (see e.g. <https://laconga.redclara.net/oferta-pedagogica/>).

Training activities : the developers of the e-learning platform have provided training sessions and tutorials to the academic staff involved in the project. Some examples:

Description for people starting contributing to the project: <https://laconga.redclara.net/courses/tools/tools.html>
Tutorials in youtube: https://www.youtube.com/playlist?list=PLGC_ZB9twAHupoPwwFgrvtlM5Zmnc7ApW

The same has been done by the developers of the instrumental platform.

No

Quality of cooperation

Project management

Partnership Agreements :

The signature process started in May 2020, after the arrival of the PM. The coordinating institution adapted the general template according to each Partner Country's institutional and political situation. There was a consensus as to the budgetary elements of the grant distribution during the project lifetime. The final versions for each HEI were accepted and sent to Partner Countries by July 2020. By September 2020, Université de Paris had received eight out of ten Agreements signed.

Along with the Agreements, the partners had to sign new Mandates as the coordinating institution changed its legal status, as Paris Diderot and Paris Descartes fused to become Université de Paris. As already mentioned elsewhere, this fusion process has had a negative impact on some aspects of the overall project management, like administrative procedures.

The main difficulty during this process was to secure the signature by legal representatives of every institution, in view of the sanitary context of lockdown and distance-work. It is important to indicate that Latin America has been very severely affected by the pandemic situation. The two Venezuelan partners had large delays in providing their documents. The coordinating institution received the documents from Universidad Simon Bolivar (USB) in January 2021 and from Universidad Central de Venezuela (UCV) in May 2021. This situation did not affect in any way the participation and commitment of USB and UCV in the development of the project. The coordinating team was communicating regularly with both partners administration and academic staff.

Management tools:

LA-CoNGA physics has integrated a set of tools for regular communication and interaction with the consortium. Most of these are open access, in agreement with the project general vision:

Instant messaging : Mattermost - free messaging with backup support and organized conversation divided in topic channels (<https://mattermost.com/>)

An email address for official purposes, provided by our partner RedCLARA.

Support/backup storage and document sharing for managing purposes - github platform with public access to official documents and WP structure (<https://github.com/LA-CoNGA>)

A Zoom platform professional access, provided by our partner RedCLARA.

A Gantt management tool to visualize the evolution of management activities.

Internal communication and decision-making process

Fluent and transparent communication with partners at several levels of organization, has allowed the project to maintain fruitful relations with all HEI. As indicated in the project Partnership Agreement , the coordination team is responsible for sharing decision-making information.

Regarding the coordination and follow-up of the six WP, the project has maintained the management structure provided in the application.

Weekly consortium meetings are scheduled since the beginning of the project. Relevant information is shared, and all the members are free to participate and present pertinent topics for the community. Thanks to the project's main communication tools, distance work and urgent matters are rapidly shared.

Due to the sanitary context, the LA-CoNGA physics consortium was not able to organize the initially scheduled kick-off meeting in May 2020 and a first live meeting with all the community was not possible. In view of this, we have organised a number of bilateral meetings with high representatives from each HEI, and two larger meetings with the ensemble of administrative and academic staff from all partners.

Involvement of partners and stakeholders

Management:

A successful implementation of the project requires a fluent and efficient communication between all partners. Université de Paris (UP) is the coordinating institute. Our PM was hired in April 2020. Due to the transient fusion process at UP, it has sometimes been difficult to establish an efficient internal communication with key administrative contacts. Therefore, some procedures have been time-consuming, and have affected the general project planning.

Share of responsibilities

The project maintained the initially proposed WP management governance. While most HEIs hold a coordinating role in a specific WP, the participation and commitment from all HEIs is visible in precise WP tasks and the overall evolution of the pedagogical framework. Each HEI project coordinator is regularly present in our consortium weekly meetings.

Regarding HEI partners management staff, the first step for the coordination team was to keep track of key contacts. The project has established communication with Faculties, International Relations, Finances and Press offices. Therefore, it was possible to efficiently inform about the LA-CoNGA physics goals and stimulate participation of the partner HEIs in the project. Thanks to a fluent communication in Spanish, the coordination team keeps an efficient interaction at all levels. In February 2021, the project organized an annual report meeting for Partner Countries. This event was divided into a general activities report and three thematic round-tables: Faculties – International Relations – Press and Communication for science and international projects. This event allowed LA-CoNGA physics to consolidate a long-term vision of academic cooperation, and to easily interact with key contacts. Also, since most of the partners already had institutional partnerships among them, their interactions were easier. Regarding the project two European partners, a single contact (European Project Manager) was established.

Public Authorities

Regular interactions with International Relations offices have been necessary in order to understand and adapt internal procedures and national legislation.

As part of the commitment undertaken by the institutions, the project coordination organized from October 2020 to March 2021, a series of bilateral meetings with each partner country legal representative (Presidents). All confirmed their HEI's will to provide continuous support to the project.

Finally, the coordination team contacted the Erasmus+ representative in each Partner Country (Mr. Galo Nina in Ecuador, Mr. José Luis Arteaga in Peru and Ms. Vanessa Viera in Colombia). The aim of these meetings was to give wider details of the project, and request additional institutional EACEA Erasmus+ support following various internal requests about work-time participation from the project Local Coordinators. It was not possible to establish contact with a EACEA-Erasmus+ representative in Venezuela.

Extent students/ other external stakeholders

Within the evolution of the project, the WP5 has worked on developing the involvement of High Schools (teaching staff and students) in Citizen Science projects with the support of LA-CoNGA physics staff.

Finally, the project established partnerships with external stakeholders. International research institutes and industrial partners bring continuous support through conferences, trending topics regarding Advanced Physics in Latin America and future partnerships for students. These stakeholders however do not participate in Management and/or implementation activities.

Management of the grant

The grant management procedures and use of the grant were specified in the Partnership Agreements. However, the project adapted the use and transfer of the grant according to the internal situation of each partner. This particularly applies to the two Venezuelan HEIs..

Regarding the use of the grant and first transfers of funds after signature of the Partnership Agreements, the consortium commonly decided that due to the sanitary context and local institutional situation for all members, the first transfer of funds represented 30% of the total amount only for staff costs. This first transfer allowed the project to test the required administrative procedures in each institution (including the coordinating institution) during the particular sanitary context, at the time where all institutions were closed. Due to its current situation, UCV has not received yet any transfer of funds. It is important to mention that Staff costs are not representative of all the general work and commitment partners have put during the reporting period.

Moreover, after previous consultations with the consortium, it was commonly decided that the project funds for equipment were to be managed by the coordinating institution, in order to avoid spread administrative procedures and an eventual delay and/or difficulty to access to the needed equipment by each HEI. Therefore, Université de Paris has been in charge of purchasing with local providers and intermediaries the required equipment.

Finally, the project mobility grant was unused, which leads the coordination team to request future modification of the project grant distribution for other items, such as staff costs, equipment and sub-contracting beyond the statutory 10%. In July 2021, each HEI mobility grant for stay costs has been used to finance distance-work internship for eight students who are working full-time in their final Master project.

For all the required purposes of the use of the grant, the coordination team has maintained personalized communication with each Partner institution in order to provide an adapted follow-up according to the necessity and national/institutional context. Moreover, the project has provided official certificates with relevant information regarding transfer of funds and future financial procedures.

Finally, co-financing has been crucial during 2020 to ensure fluent communication and administrative and financial follow-up.

It has been particularly difficult for Université de Paris in its first year of creation, to effectively respect payment deadlines and purchase procedures, as internal processes are constantly being created and redefined. In addition, key contact people have left the institution, which makes it more difficult to establish efficient communication in a distance-work environment. This context has delayed payments on several occasions (staff costs transfers, equipment purchase, tender procedure, subcontracting payment). While several meetings and partial solutions have been established and adapted to speed the process, the overall transient situation has not stabilised yet, and the project currently faces various important payment delays (the subcontracting payment was delayed for over eight months, and the tender procedure for the Nuclear Physics platform took nine months). This situation can be considered a high-level management risk for the project.

IMPACT AND SUSTAINABILITY

Awareness raising, dissemination, sustainability and exploitation of the project results

This aspect has been partially described in Section "Project visibility" where the communication and dissemination plan and current dissemination/awareness raising-related outcomes were described.

Five additional actions concerning the sustainability and exploitation of the project results worth mentioning are:

- 1) All members of the consortium play a key role in implementing the project, with well-defined leadership responsibilities and tasks. This ensures they acquire/strengthen the needed skills, know-how the project works internally and build internal connections (c.f. Table of activities).
- 2) Training and documentation for the e-learning platform and instrumentation equipment use available so far have been made available to the community (c.f. "Teaching / Training Activities" section)
- 3) Several HEIs have contacted the project coordination in the region on how to join LA-CoNGA physics. Due to pre-existent cooperation agreements with partner countries, HEIs students from HEIs outside the project followed a subset of the courses in 2021, e.g. Universidad Nacional de Colombia, Universidad del Valle (both in Colombia), Universidad de Guayaquil in Ecuador. These experiences showed us that LA-CoNGA physics educational resources are highly sustainable and that increasing the number of students with access is possible. However, it also proves the importance of developing new cooperation agreements and degree recognition partnerships among the institutions, a discussion we have started already within our universities and with contacts at the UNESCO-IESALC. For example, several international relations offices have initiated to establish bilateral agreements to support cooperation in joint research projects. We can mention YACHAI-UIS and recently USFQ-UIS .
- 4) LA-CoNGA physics members have actively participated in the Latin American Strategy Forum for Research Infrastructure (LASF4RI) process. During 2019 and 2020, LASF4RI joined academics, policymakers and funding agencies to create for the first time a roadmap for the development of High Energy, Cosmology and Astroparticle Physics in Latin America. LA-CoNGA physics is used as an example for advanced training for highly qualified resources in its Strategy Document submitted to the IV Iberoamerican Science and Technology Ministerial Meeting on October 27, 2020.
- 5) We are also interested in having our e-learning platform and work/teaching methodology used by different knowledge fields beyond physics. In this direction, we are working with our partner RedCLARA in a project called miLAB (c.f Section EU Education, Cooperation & Development policies)

Finally, the list of realised deliverables/project products is available in the Tables for each WP. The changes that have occurred in this result since the original proposal and the updated planned activities list is also available in these tables.

Statistics and Indicators

Type of equipment:

- books and pedagogic material
- audio-visual equipment
- Computers and software
- lab material
- Other

For Curriculum Development projects

Yes

Level of new/updated courses:

- Short cycle
- 1st Cycle (e.g. Bachelor)
- 2nd Cycle (e.g. Master)
-

3rd Cycle (e.g. Doctoral)

Vocational Education and Training

Type of recognition:

HEI Degree

National degree

Multiple Degree

Joint Degree

Volume (in ECTS) of new/updated courses

60

The new study programme includes:

Placements/internships for students

Career orientation service

Career development measures

Number of learners / trainees enrolled (per intake / course delivery)

50

Type of skills/competence developed:

Transversal/behavioural skills

Technical /academic /scientific / research skills

Linguistic competences

% of the new curriculum taught in foreign language of the the total of new curriculum developed by the project

0

For Training/Mobility Activities

Number of partner country "HEIs' students" trained

50

Number of partner country "HEIs' academic staff" trained

25

Number of partner country "HEIs' administrative staff" trained

20

Number of partner country "non-HEI individuals" trained (priv. sector, NGOs, civil servants, etc.)

5

IMPACT AND SUSTAINABILITY

Impact at individual level

Extent of attention given to vulnerable groups

to a small extent

Number of direct beneficiaries in the Partner country(ies) per year: academic staff from HEIs

25

Number of direct beneficiaries in the PCs (/year): administrative staff from HEIs

20

Number of direct beneficiaries in the PCs (/year): HE students

50

Number of direct beneficiaries in the PCs (/year): non HE individuals

5

Impact at institutional level

Extent of impact at institutional level: for instance new courses / strategies (policies, regulations) / services (units, centres)

totally accomplished

Potential of planned project measures to contribute to new national cooperation activities in the Partner countries HEIs as a result of the project (Memorandum of Understanding /research projects / joint publications /participation in networks or associations etc.)

to a very high extent

Potential of project to contribute to new international cooperation activities in the Partner countries HEIs as a result of the project (international agreements / Memorandum of Understanding / research projects / joint publications / participation in networks or associations, etc.)

to a very high extent

Impact on the HE Sector

Potential of project to contribute to new (/updated) national or regional policies / laws / regulations in HE

to a very high extent

Potential of project to contribute to the establishment (/ further development) of external bodies (/associations /agencies)

to a high extent

Potential of project to contribute to improve the excellence / competitiveness / attractiveness of the Higher Education institutions

to a very high extent

Innovative character of the planned results (i.e. the courses developed; the new tools, services, procedures delivered; the strategies implemented for reaching the target groups; etc.)

to a very high extent

Impact on the society as a whole

Potential of the project to pay particular attention to least developed countries

totally accomplished

Potential of the project to engage Partner Countries HEIs in new means of cooperation with employers and other stakeholders (e.g. NGOs, associations, etc.)

to a high extent

Measures contributing to improving lifelong learning approaches in the Partner Country HEIs

totally accomplished

Sustainability

Institutional support for Partner Country HEIs to sustain project results

to a very high extent

Measures to collect Sources of financial (/logistic) support for sustaining the project results from:

- Partner HEIs
- Public authorities in Partner countries
- NGOs
- Private sector
- European Union
- Other

QUALITY OF PARTNERSHIP & COOPERATION

Involvement of students in the project implementation

totally accomplished

Involvement of non-educational stakeholders in the project implementation

to a small extent

RELEVANCE in relation to project objectives

To what extent the project contributes to the policy objectives of the Partner Countries

to a very high extent

Project potential to promote EU's horizontal policies

- Agriculture, fisheries and foods
- Business
- Climate action
- Cross-cutting policies
- Culture, education and youth
- Economy, finance and tax
- Employment and social rights
- Energy and natural resources
- Environment, consumers and health
- External relations and foreign affairs
- Justice, home affairs and citizens' rights
- Regions and local development
- Science and technology
- Transport and travel

Meetings, Training and Mobilities

Meetings, Trainings and Mobilities

Estimated dates of consortium meetings until the end of the projects

Venue country	Venue city	Date of Meeting
Peru	Lima	09/01/2023
Colombia	Bucaramanga	09/05/2022

Training and Mobilities

Event	Purpose	Type of participants	Gender	Number	Country of Origin	Country of destination	Duration (in weeks)	%compared to objectives

Draft

Attachments

Type of File	Name of the File
Budget Table	TECHNICAL_REPORT_LA- CONGaphysics_financial_statements.xlsm
Declaration of Honour	Declaration_of_honour_signed.pdf
Table of achieved results	LA-CoNGA_physics_table_of_achieved_planned_results.pdf
Dissemination/Exploitation Plan	propuesta-plan-com-laconga.pdf
Quality Assurance Plan	LA-CoNGA_QualityAssurance.pdf
Request for Payment	Request_second_prefinancing_signed.pdf
Specification 1	2021-04-21-LA-CoNGA-DMP.pdf
Specification 2	LA_CoNGA_Plan_de_diversidad.pdf
Specification 3	
Specification 4	