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Working Methodology with Public Universities in Peru during the Pandemic—Continuity of Virtual/Online Teaching and Learning

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Abstract: This article describes the consultancy provided by the UTEC-UNED-TECSUP University Consortium to six national universities in Peru, during the COVID-19 state of emergency. This action aims to promote the techno-pedagogical change from a face-to-face to a virtual/online educational context. The process consists of three stages that ensured the continuity of the virtual/online educational service: diagnosis, design, and training, to strengthen instructional and digital competencies, support, and techno-pedagogical monitoring. It includes the basic principles of constructivist and constructionist learning theories for active and quality teaching and learning for the agents involved, and, in addition, the guidelines set by the emerging Peruvian regulations during the pandemic to move towards a digital university model according to the times. After a 157-day intervention, the analysis of the results raises some reflections: the importance of the socio-cultural context and its influence on the concept and development of the instructional act; the concept of distance learning in territories where connectivity is the main difficulty, and the university institution, in terms of a non-presential educational model with open and versatile methodologies, which anticipates a long process, involves a scheduled follow-up, requires fluid communication and demands continuous feedback.

Keywords: COVID-19; digital divide; digital competence; distance learning; higher education; teacher training; teacher mentoring

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1. Introduction

During the health emergency period caused by the pandemic, educational institutions worldwide had to adapt and change their teaching methods. The transition from face-to-face to virtual mode became an essential pillar for the continuity of the virtual/online educational service. In this sense, universities initiated the change of teaching modality, evidencing the need for distance learning, which has required a far-reaching methodological change [1–3].

According to the COVID-19 Report by ECLAC-UNESCO [4] (p. 1), many of the measures adopted by Latin American and Caribbean (LAC) countries in response to the crisis are related to the suspension of face-to-face classes at all levels, which has given rise to three main fields of action: the deployment of distance learning modalities, using a variety of formats and platforms (with or without technology); the support and mobilisation of educational staff and communities, and attention to the health and well-being of students.

LAC countries have launched emergency remote learning initiatives to provide short-term solutions and a certain continuity in teaching and learning processes. Each initiative has depended on the technical capacity of each institution, its organisational skills, and

the digital competence of its educational community. Few countries had content platforms and learning management systems (LMS) in place [4] (p. 1).

Faced with a complex and uncertain context, higher education has had to adapt and respond to change [5]. One of the latent difficulties in this methodological change has been the continuity of teaching and learning processes in face-to-face educational institutions [6]. This has forced the digital transformation of universities, the development of new training practices for teaching staff and the consequent change in student learning strategies, more related to self-regulation, problem solving, creativity, etc. [7–9].

In the case of Peruvian universities, the focus of analysis in this article, the organisational guidelines were placed within the framework of the national state of Health Emergency, established through SUNEDU Board Resolution 039-2020 [10] and Vice-Ministerial Resolution 085-DIGESU [11]. In addition, the program for the improvement of the quality and relevance of university and technological higher education services—PMESUT— identified the need to implement a strategy that will help to adapt the higher education service provided by the country's public universities to a virtual/online modality. From this point of view, call No. 8 is launched to promote the higher education service continuity of public universities, strengthening their capacities in terms of academic planning, implementation of the educational service provision and recommendations related to the teaching exercise regarding the virtual/online adaptation of courses in undergraduate study programs, based on the use of Information and Communication Technologies (ICTs).

In this sense, the Consortium formed by the Peruvian University of Engineering and Technology (UTEC), the Spanish National University of Distance Education (UNED) and the Peruvian Institute of Higher Technological Training Studies (TECSUP) was one of those selected to support six national universities, four of them intercultural [12], in response to the context (Figure 1).

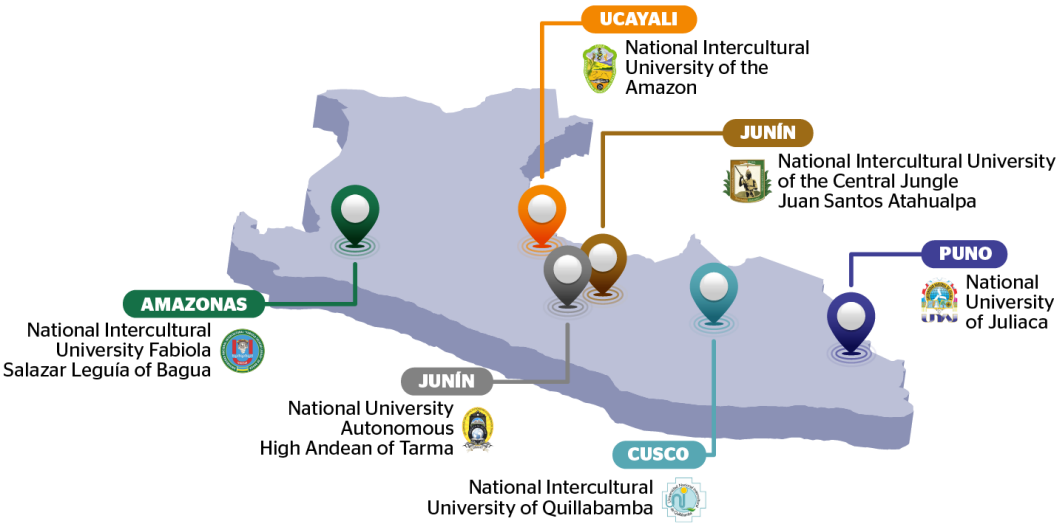

Figure 1. Map of the six Peruvian public universities.

From August 2020 to January 2021, we carried out a consultancy process that included a methodology to be developed in three stages: diagnosis, design, and training, aimed at strengthening instructional and digital competencies, support, and techno-pedagogical follow-up. It involved 5034 people from the universities: 347 teachers and managers, 4932 students and 25 members of the technical staff.

Among other issues, the diagnostic phase revealed improvement opportunities in the technological instructional training of professionals at the institutions, which led to the design, development, and implementation of a scalable and comprehensive training process, consisting of 83 courses. Of these, 2378 certificates were issued and distributed as follows:

- Basic, general, and specific for managers, teachers, and technical staff (2158 certificates).
- Induction, start-up, and implementation certificates for students (220 certificates).

A total of 132 subjects were partially virtualised, reaching 100% virtualisation in 103 of them, and, in some of them, making a drastic change in the use of the LMS.

In conclusion, this consultancy helped the six Peruvian universities to ensure that the lack of connectivity in the community and educational institutions, the excessive workload, the scarce skills in the use of the platform and the instructional-technological resources provided, among others, became evident in the context.

2. Materials and Methods

As mentioned in the Introduction, the consultancy process consisted of three stages: the first, Diagnosis; the second, Design and Training; and the third, Techno-pedagogical Support and Follow-up. Each phase had its own identity and a completely different working structure. To facilitate its understanding, we present the methodological structure of the project (Figure 2).

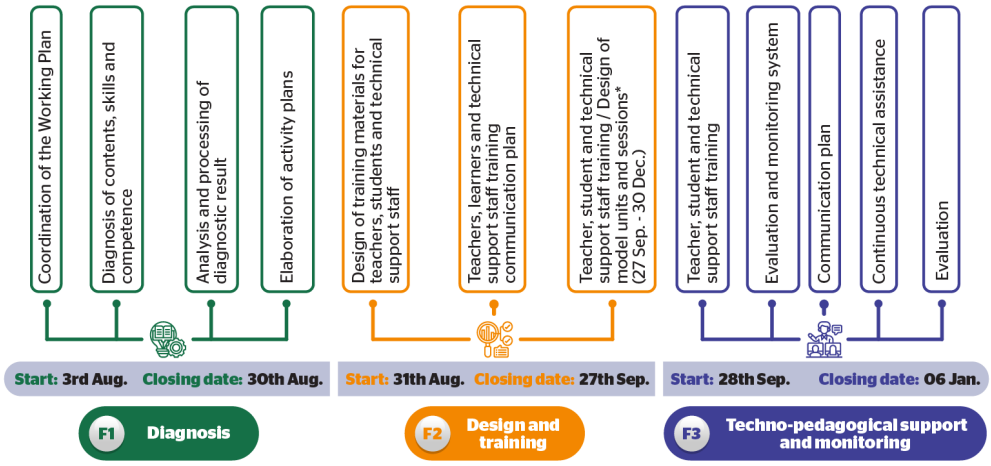

Figure 2. Timeline of the technical proposal methodology.

2.1. First Stage. Diagnosis

Diagnosis is the first step in the educational process, since without knowing the initial situation of the center and its community, it is not possible to perform an adequate intervention for beneficiaries [13] (p. 98). In this stage, we describe the general methodology, both in terms of the data collection design, the techniques used, the instruments elaborated ad hoc, etc. The social and cultural diversity of the six universities advised by the Consortium meant that, in most cases, it was necessary to adapt the methodology to the uniqueness of these universities. According to Espinosa [14], intercultural universities have certain contextual/situational characteristics deep-rooted in the community, which must be evaluated from a glocal (global/local) point of view.

The main objective was to gather as much information as possible to propose a training, support, and improvement plan for higher education institutions in the process of moving from face-to-face to distance learning. Since it was an external diagnosis, there was a risk of focusing on aspects not considered by the educational institutions in their internal analyses [15] (p. 165). The systematisation of the data collection process, the selection of diagnostic techniques and the development of the instruments should be in line with the guidelines set out in SUNEDU Board Resolution 039-2020 [10] and Vice-Ministerial Resolution 085-DIGESU [11]. Each university subsequently adapted these regulations to their specific context.

This phase was designed following a qualitative methodological model [16,17], incorporating content analysis (organisational documents and textual productions (printed and electronic), part of the universities' identity) as a fundamental axis, which helped us

to systematise and analyse the academic structures in an organised and objective manner. Therefore, we conducted a multiple case study, which allowed us to approach the institutions from three dimensions—organisational, competence and technological—with the collaboration of their members. This usually facilitates access to information and allows the study of specific facts, selecting biographical information, their own intentions and values. In this way, the true meaning of the facts can be grasped [18].

The work carried out in the first phase is framed within the instrumental or collective cases, since it aims to learn about each specific situation through each case so that this singular knowledge can help us understand shared conditioning factors and circumstances, with more or less similar elements between them. In addition, a flexible design allowed us to find new and unexpected situations linked to each entity [17].

"Working on a case means entering into other people's lives sincerely interested in learning what they do, why they do or do not do certain things, and what they think and how they interpret the social world in which they live and develop" [18] (p. 7), so it is preferable to approach a case in which the approximation opportunities are good and, at the same time, the opportunities for learning about the problem are sufficiently broad to be able to generalise the results [19].

As part of this analysis process, we advocated a participatory diagnosis, which allowed the co-construction of knowledge and of the executive and formative processes within the institutions, where the agents involved could reflect and analyse together with the experts to move towards the construction of a future-proof and strong institution [15] (p. 171).

Different profiles were involved: university managers and heads, technical staff, teaching staff and students [20]. We considered the existing differences in terms of the sample size of each institution's universe, the groups selected for interaction and their availability. In his social research methodology, Corbetta [21] (p. 158) points out that to find out about a particular social phenomenon (and educational facts), we have two ways of gathering information: observing and asking questions. In this process, the members of the university communities were the main information gatherers.

The techniques and instruments used in the universities under study to create a personalised diagnosis were varied, and it should be noted that the same instruments were not used in all the universities. To gather as much information as possible, the different groups in the university communities were involved, including university heads and managers, teaching staff, technical staff, and students. Technical meetings were held with managers, university leaders and technical staff to discuss various topics using the Google Meet videoconferencing tool; thematic meetings and focus groups were held with teaching staff and students on the same topics in four of the six universities, while in the other two institutions, data collection was conducted using a Google form sent by e-mail to facilitate access to the population. University managers used the GAMOD Guide for self-diagnosis of institutional capacities and needs in the distance learning modality, designed by the Ministry of Higher Education (MINEDU) in collaboration with the UNESCO International Institute for Higher Education in Latin America and the Caribbean (IESALC) during the pandemic, and the diagnostic matrix tool designed by PMESUT, based on three dimensions: technology, organisation, and digital competence. In addition, a documentary review of the normative and curricular material was carried out, which was complemented, in some universities (four of the six involved), with the observation of the virtual spaces dedicated to teaching activity. Finally, there were discussion groups and shared analysis for decision-making, together with the managers and heads of the university institutions (Table 1).

Chronogram of the Diagnostic Methodology

The data collection process in this diagnosis was transversal, and data was collected over a period of 37 days. The process lasted five weeks, dealt with the particularities of each institution and considered the different players, dimensions, and techniques. In the first week, after the official meeting to present the project, from the coordinators and

the technical teams to the heads of the universities involved, the first working meetings between the Consortium and the universities began. These meetings were held periodically during the diagnostic phase. In the second week, we incorporated documentary analysis. During the rest of the time, there were meetings with students and teaching staff, as well as questionnaires and observations of the virtualised spaces. The three dimensions of the Diagnostic Matrix were considered as the main axis of the diagnosis: organisation, competence and technology. The following Table 2 provides an overview of the process.

Table 1. Summary of data collection techniques and instruments.

		Technique	Instrument	Evidence Collection Tool	Players
1	1.1	Technical meeting	Thematic meetings	Google Meet (videoconference)	University managers
	1.2	Group technical meeting/Focus Group	Thematic meetings	Google Meet (videoconference)	University heads and managers
	1.3	Focus Group	Thematic meetings	Google Meet (videoconference)	Teachers Students
2		Documentary analysis	Checklist/Analysis grid	Corporate web/Email/Shared folders	Policy documents from the Ministry and Universities Academic documents
3		Non-participant observation	Checklist/SWOT matrix	Virtual spaces	Virtual documents
4	4.1	Questionnaire	Preliminary questionnaires (Pedagogical Dimension/ Technological Dimension)	Email Google Meet (videoconference) Information collection tool	Managers and academic heads of the university ICT Manager
	4.2.	Questionnaire	Questionnaire	Google Forms/Email	Teachers Students
	4.3	Questionnaire	Organisation, competence, and technology diagnostic matrix	All tools	All players involved
5		Discussion group and shared analysis in decision-making	Inventory/Curriculum grid	Google Meet (videoconference) List of selected courses	Academic managers/heads

Table 2. Overview timeline of the diagnostic process.

Week 1	Week 2	Week 3	Week 4
Presentation to institutions			
Management Meetings	Management Meetings	Management Meetings	Management Meetings
Technical Team Meetings	Technical Team Meetings	Technical Team Meetings	Technical Team Meetings
	Documentary Analysis	Documentary Analysis	Documentary Analysis
		Virtual Spaces Observation	Virtual Spaces Observation
		Teacher Meetings	Teacher Meetings
		Teacher Questionnaire	Teacher Questionnaire
		Student Meetings	Student Meetings
		Questionnaire/Student discussion groups	Questionnaire/Student discussion groups
Diagnostic Matrix: organisation, competence, technology	Diagnostic Matrix: organisation, competence, technology	Diagnostic Matrix: organisation, competence, technology	Diagnostic Matrix: organisation, competence, technology

2.2. Second Stage. Design and Training

The Consortium developed a training plan that integrated top-down and bottom-up resources and means from that responded to the training needs of the educational community in each of the universities analysed [22]. We opted for a sequenced training model, designed by experts in distance learning and supported by online tutors, contextualised in/from the territory, prioritising respect for their culture and ancestral values [12].

The mission was to contribute to the strengthening of digital competencies to ensure the continuity of the virtual/online educational service. The aim was to advance in all areas and sectors of the university towards a focus on student learning (adaptive teaching) [22].

The training plan strengthened the skills-based curriculum, offering a wide space for digital competence as a key skill to enable better professional, academic, managerial, or technical performance of the target audience in virtual/online contexts [23]. Self-regulation learning strategies [24–27] were used as the basis of an active and constructive process, by which the person sets their own learning objectives, trying to monitor, regulate and control their thoughts, motivation, and behavior according to their goals [28,29]. Everyday learning [30,31] was prioritised, focusing, and reflecting on what was important before moving forward and constructing new idea-generating links [32–34].

The training plan was based on the following milestones:

2.2.1. Prioritisation/Adaptation to the Detected Needs

In the analysis of training needs, we identified several relevant figures or players in the universities. They were conceptualised as "target audience", in view of their close relationship with teaching-learning processes endorsed from a socio-critical and inquiring paradigm [35–38].

The general criteria followed to select the target audience for the training plan have been conditioned by the change from a face-to-face to a virtual educational model, which has placed the university community in a challenging scenario, resulting in certain consequences:

1. The role of the participants (managers, teachers, and support technicians) focused on adapting the educational model and teaching methodology to the students' learning, from analogue to digital.
2. The role of the participants (students) focused on developing digital competencies and self-regulation of learning, that would facilitate the incursion into distance learning environments and the development of autonomy and control of their own goals.

The different techniques and instruments used to collect information during the previous phase (Table 1) made it possible to identify the training needs for each of the players involved (managers, teachers, students and support technicians) in the universities, and to generate a training plan sequenced in time and objectives, giving rise to three training programs (informative, in-depth and development and implementation) which are organised, at the same time, into 83 courses and workshops called, in general terms: basic, general, and specific (Figure 3).

Figure 3. UTEC-UNED-TECSUP training plan.

The goals of the training plan, depending on the roles [9] were:

- Technological training, in general.
- Training in techno-instructional methodology.
- Knowing and using tools, applications, and other utilities to: gain time and quality in tasks; experiment with new ways of acting; create innovative actions and procedures.

2.2.2. Implementation of Training Programs with Different Levels of Curriculum Depth

The pedagogical strategy used in the design of the plan is based on an escalation of competence achievement, from theory to practice, ending with problem solving and application in daily activities. The participant's starting point, the role of his or her mission and the context of actual application of the final learning were considered. "The transformations in teaching do not come from ICT, but from the systemic perspective of the interaction of different elements: teachers, learners, methodological, contextual and political" [39] (p. 256).

The objectives of the three training programs were:

- Informative Program. To acquire a basic mastery of the global vision of the concepts that underpin the theories and procedures that they will have to learn and develop later.
- Deepening and development program. Acquire an intermediate mastery of the procedures involved in the performance of activities as a manager, teacher, student, and technical staff.
- Implementation program. Acquire advanced proficiency in the practical use of the procedures involved in carrying out activities as a teacher, student, and technical staff.

2.2.3. Curricular Design of the Courses Based on the Training of Techno-Instructional Competencies

The design and subsequent development of the training was carried out by various actors: pedagogical support (academic coordination, trainers, and tutors); technological support (ICT coordination and support technicians), and virtual assistance (virtual community facilitator) (Table 3):

Table 3. Key players in the training process and their roles.

	Players	Number	Roles
Pedagogical support	Academic coordinators	6	Design of the curricular structure of programs and courses.
	Trainers	18	Elaboration of the learning guide, contents, and materials; implementation in the LMS; start-up.
	Tutors	18	Tutoring, monitoring and evaluation of course participants.
Technical support	ITC coordinator	1	Planning and execution of the proposal for technical assistance in training implementation.
	Support technicians	25	Follow-up of training support; training in the use of the LMS and educational management systems and monitoring of different groups.
Virtual support	Virtual community facilitator.	1	Facilitation, information, and monitoring of virtual spaces.

The implementation of the curricular structure of the courses in the LMS was similar and had to respect the order and sequence of what was designed. Two types of learning were pursued: one, to offer a prototype of instructional design to be considered in the future; two, to facilitate visual recall of the learning itinerary to be followed in the LMS.

The common methodological aspects were offered by combining synchronous and asynchronous in the following components:

1. Presentation of content through different media and formats, distributed with organised modules, sequentially structured.
2. Interaction (peer/tutor-participant). Forum for doubts and participation forums to go deeper into the contents.
3. Production. Learning activities to fix basic contents and assess their assimilation (feedback).

Specific notes on the curricular elements:

a. Selection and elaboration of content as a vehicle for competence development

The starting point was the concept and the place given to content as a curricular element, a vehicle facilitating competencies: it is not the end, but the means to achieve learning [40].

The course content was designed to achieve two types of objectives: the target audience and the training program. The first step was to decide on the format of the curricular documents: teaching guides and basic documents. The second step was to prioritise the content for each program and target audience. The idea of prioritisation and sequencing was the focus at this point. The third step was to select and/or elaborate content that respected the objectives of each course and facilitated participants' learning. The contents, likewise, were differentiated into three major themes or thematic axes (Figure 4).

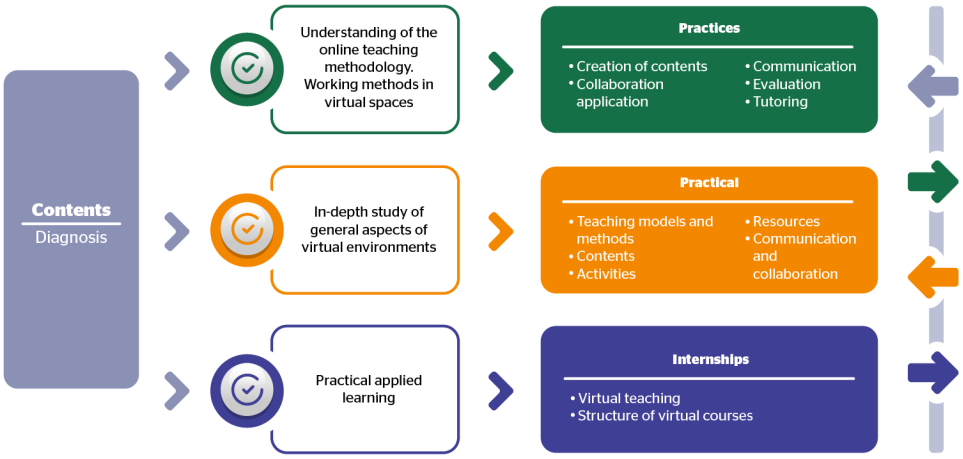

Figure 4. Contents by thematic axes.

b. Selection and creation of instructional materials, as a support axis to reinforce competencies

The course contents were presented using a wide and diverse typology of instructional materials:

- Text documents for the basic content.
- Multimedia documents (presentations, videos, video tutorials, podcasts, etc.).
- Videoconferences.
- Web resources (thematic portals, websites, repositories, databases, etc.).
- Resource collections, bibliographic references, electronic references, and additional resources for consultation.
- Technological applications, tools, and programs.
- Guides and manuals for monitoring them.

These materials aimed to offer different channels to access the contents, a greater degree of motivation and attractiveness in the way they are presented, as well as a greater number of places to obtain information, resources, and direct learning and practice areas, to learn by doing [41–43].

c. Learning activity design, as a hub for competence training and feedback processes, foundation for follow-up and tutorial guidance

The key to learning is practice and training: combining a variety of learning and assessment activities [44]. Both are differentiated by the objective they pursue, either to reinforce what has been learnt or to demonstrate that it has been learnt [40]. The feedback provided in the learning activities is key to achieving the proposed goals [45,46].

In any training process, the participant develops internal control and adjustment pathways that promote self-regulation processes, known as internal feedback; this is added to the information received by external agents (teachers, tutors, peers, etc.) or external feedback that allows the development of a global self-regulation process [47,48]. The external agent, in this case, was the tutor, who regularly and in a planned manner supported the participant during the courses. The tutor served as a link between the participants and the activity's trainers.

There were different types of activities grouped in the typology defined by Marcelo et al. [49]: assimilative, information management, implementation, communicative, productive, experiential, and evaluative (Table 4).

Table 4. Activity typology according to Marcelo et al. [49].

Activity Type	Contents	Examples
Assimilative Information management Implementation Communicative Productive Experiential Evaluative	**Conceptual**	Listening to the trainer's presentation.
		Searching for information.
	Procedural	Writing a report.
		Solving a problem or a case.
		Questionnaire completion.
		Participation in forums and debates.
	Implementation	Making a presentation.
		Learning and practice using a specific technological application.

d. Planning learning assessment. The key to effectiveness

Online courses offered the possibility of using a wide range of assessment tools and techniques, according to the time (when?) and the way (how?) they were going to be used [50]. The evaluation was based on two pillars: formative evaluation with subsequent feedback as a learning guidance process (tutor's responsibility) and final evaluation (trainer's responsibility).

Table 5 shows the combination of learning and assessment activities that were carried out, related to participants' performance:

e. Mentoring to support participants' self-regulation in online contexts

As these were short courses with many participants, we considered the speed, frequency and detail of the feedback given to the participants, focusing on the learners' abilities, on what they were doing; we always encouraged performance improvement of the tasks, and the guidance and support was appropriate to the type of activity and the assessment criteria [51].

According to Nicol and MacFarlane-Dick [45,46,52], the following feedback activities were carried out by the tutor to reinforce the participant's abilities:

1. Clarifying what a "good" performance on the task entailed (learning objectives, assessment criteria, expected standards).
2. Facilitating self-assessment (reflection) during learning.
3. Providing qualitative/quantitative feedback on their learning.
4. Encouraging peer-to-peer dialogue on learning through forums.
5. Promoting positive motivational beliefs and improving self-esteem.
6. Providing opportunities to match current and desired performance.

Table 5. Combination of learning and assessment activities.

Assessment Types	Actors/Participants			
	Automatic	Self-assessment	Peers	Mentor
Diagnostic	Digital skills questionnaire Expectations questionnaire		Reflection	Reflection
Learning	Questionnaires			
		Problem solving		Problem solving
		Case studies		Case studies
		Essay		Essay
			Debates	Debates
Assessment	Satisfaction questionnaire			Questionnaires
				Problem solving
				Essay

2.2.4. Training Plan Monitoring and Follow-Up Process

Throughout the training action, different follow-up and monitoring strategies were carried out in a tangential way, which allowed us to know how it was evolving.

Knowing the learning development process of the participants favored timely decision making for a better functioning of the training processes.

The strategies established for monitoring and follow-up of the training program are summarised below (Table 6).

Table 6. Monitoring and follow-up system of the training program.

Strategy	Tools	Actors
Training process monitoring	Digital skills questionnaire.	Managers, teachers, students, and support technicians.
	Initial expectations questionnaire.	
	Final satisfaction questionnaire.	
Course attendance rate	LMS resources, through forums, completed activities, videoconferences, etc.	Trainers and mentors.
Perception on logistical organisation, resources, and attitude of attendees	Questionnaire results. Personal appraisal reports. Self-assessments and personal analyses.	Trainers and mentors.
Participants' perception	Digital skills questionnaire.	Students.
	Initial expectations questionnaire.	
	Final satisfaction questionnaire.	
Attendance monitoring	Synchronous and asynchronous attendance reports.	ICT Coordinator and Support Technicians

These strategies were reinforced by additional actions such as:

- Regular meetings of the Consortium's team of academic coordinators to benchmark the evolution of the courses performed by the trainers in their team.
- Periodic meetings of each coordinator with their assigned team of trainers to check the evolution of the training, and to take the appropriate decisions.
- Creation of fast and agile communication channels to solve any inconvenience that may arise in a group and quickly, without taking too much time.

2.3. Third Stage. Techno-Pedagogical Support and Follow-Up

The last stage of the consultancy process for the six Peruvian universities faced a threefold challenge: planning, designing, supporting, and implementing according to seven milestones or moments.

The work carried out with the teachers to strengthen their digital and pedagogical skills and to create virtual learning environments based on the guidelines established by the Consortium and the criteria established by PMESUT was made visible.

The techno-pedagogical support refers to the training, guidance and mentoring action carried out with the teachers involved through workshops, where they developed the virtual environments of their courses. It starts from an attitude of respect and active listening, where the existing knowledge and strengths of those being mentored are valued. Fears and insecurities are taken considered to progressively build certainties and security. The starting point is what the teaching staff knows, and they are guided through exploring technological tools based on the experience of the facilitator/researcher [53] (p. 3).

Following are the stages of the work plan established by the Consortium to meet the goals assigned within the scope of this program.

2.3.1. Planning Stage

It consisted of Phase 1: Contextualisation of the monitoring plan and techno-pedagogical support. It described the work plan, as well as its presentation and/or communication to each university. The main aspects to be considered were, among others:

- Time definition.
- Elaboration of a task chronogram and responsible persons.
- People involved in the process and roles.
- Materials or inputs needed for the virtualisation process.

It starts with the design of the virtualisation plan, according to the work schedule around two support resources: "curriculum structure sheet" and "monitoring sheet". The first one is an input that will help the teacher to have an overview of the structure of his course and the types of class sessions that compose it.

As for the "monitoring sheet", it is divided into sixteen weeks (the number of sessions per semester for courses in Peruvian universities) and becomes the "content script" of the teachers' work, which "includes a complete description of the learning content that the course will include" [54] (p. 55). This script focused on the following aspects: Course Content, Videoconference, Forum, Supplementary Material, Learning Activity and Bibliographical References. These criteria defined a 100% virtualised course.

2.3.2. Follow-Up and Support Stage

Techno-pedagogical support is a shared, progressive process, aimed at ensuring that teachers build knowledge that lasts over time, beyond the mentor's presence [53] (p. 4). For this reason, a second stage was designed with six phases of training workshops, in a 3 + 2 format (2 h of synchronous and 3 h of asynchronous mentoring per week).

These workshops became shared sessions of continuous feedback from theory to practice and to the real context of the teachers and their university culture. The needs, fears and resistances shown, as well as their previous experience before the arrival of the Consortium, were addressed.

Learning was ensured through meaningful practice linked to key issues in e-learning as outlined in Figure 5.

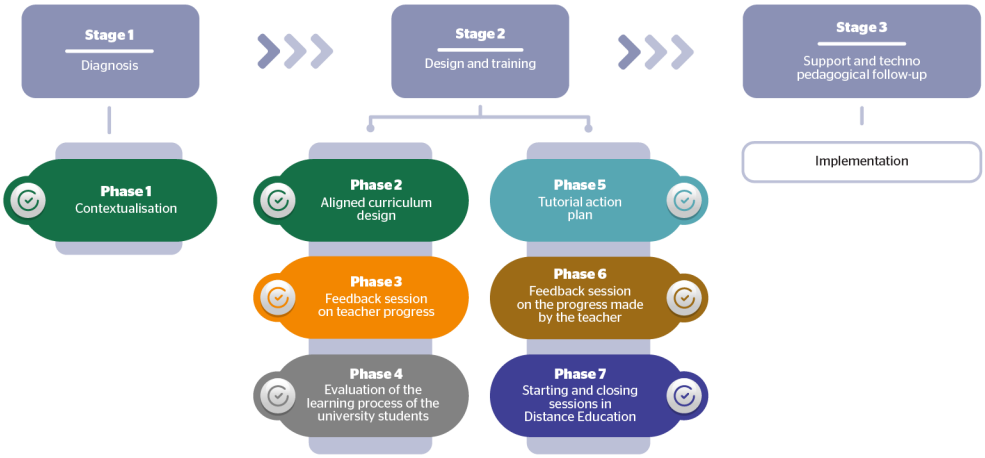

Figure 5. Phases within the follow-up and support stage.

Several challenges emerged: first, the appropriation of the key themes mentioned above, as well as the cultural appropriation of these concepts in each university context. It was at this stage that the teachers ended up considering the training program provided by the Consortium as anticipatory and necessary.

Although this stage was planned to last six weeks, it had to be extended to ten weeks. To move forward in the virtualisation of their model courses, key aspects of the process were addressed: the characteristics of each participating group and their capacity to assimilate the stages and concepts.

Feedback sessions were included to resolve collective doubts and to share the group's progress. Peer learning was encouraged throughout, allowing the mentor team to continually rethink the planning of the current phase and adapt it to new needs as they arose. The training plan became a resource to support the training needs that constantly emerged throughout the process.

At the same time, collaborative spaces were created in the LMS to share the progress of each phase, resources, and support materials, as well as WhatsApp groups or mailing lists in some cases, as channels for continuous accompaniment between mentors and teachers [55].

2.3.3. Implementation Stage

Finally, the "content script" was incorporated into the virtual classroom once the teachers completed it. The importance of adhering to the following structure of the model course was highlighted:

Course content: this involves uploading the content, uploading the files, presentations, or other instructional resources to the LMS. It is recommended to write a brief description of the content and to respect the order of dictation.

Videoconference: the tutor must upload the link of the synchronous or asynchronous session that the students will access in an orderly manner by dates and times.

Supplementary Material: refers to any content considered in the course tracking sheet. It is recommended to include a brief description of the material to be shared so that students can identify it.

Learning activity: the teacher must create and implement the activity in their virtual classroom. The important thing is that they choose the right tool according to the proposed activity (forum, task, questionnaire, etc.). In addition, it is recommended to clarify the guidelines for its implementation, to schedule and, if necessary, to share the virtual rubric for its evaluation.

Bibliographic references: bibliographic links refer to any content considered in each week. It is important to follow the standard defined by the university and share the direct access link to the digital resource.

At the end of the assessment, a "virtualisation guide" was shared with the universities, with the aim of facilitating the scalability of this process in an autonomous way. This manual includes the main milestones for a correct virtualisation process described above.

3. Results

Following the article's approach and the three phases of the project, the results are presented in the same way; the results obtained from each of them can be observed separately, enabling a detailed analysis.

3.1. First Phase: Diagnosis

During the 37 days in which the diagnosis was carried out, there were different types of meetings (technical, group and focus groups), as well as several questionnaires sent to the different groups. In addition, we conducted a detailed documentary analysis of the institutions, as shown in Table 7.

Table 7. Data collection results per instrument and stakeholder involved.

		Technique	Instrument	Players	Number of Actions (Meetings, Documents, Answers...)
1	1.1	Technical meeting	Thematic meeting	Authorities and Managers	12
	1.2	Group meeting Focus group	Thematic meeting	University heads and managers	37
	1.3	Focus group—A	Thematic meeting	Teachers	129
	1.4	Focus group—B	Thematic meeting	Students	150
2		Documentary Analysis	Checklist/Analysis grid	Regulatory documents by the Ministry and Universities Academic documents	565
3		Non-participant observation	Checklist/SWOT matrix	Virtual documents	6
4	4.1	Questionnaire	Questionnaire	Teachers	91
	4.1	Questionnaire	Questionnaire	Students	372
	4.2.	Questionnaire	Diagnostic matrix	All instruments	6
5		Discussion group	Inventory/Curriculum/ GAMOD tool	Academic managers	12

From the overall results obtained, it was possible to determine, in terms of the organisational dimension of the universities, that there was no protocol or technological support in any of them; the user management and response system was at a basic level of development, in the same way as the departments or services related to academic matters. No data were found on student monitoring and communication. Regarding teaching management, some of them (two out of six) show a high number of hired teachers (30% of the teaching staff). In terms of technology, the biggest drawback was the lack of connectivity of the student population, observed in all six universities. Finally, in the competence dimension, a lack of pedagogical and digital knowledge was observed among the teaching staff, both in terms of their functions regarding their digital profile and in the use of the tools, and, if they used these tools, they were not used effectively. In two of the universities, there was not even a platform that could support the implementation of virtual teaching; the G-suite was used.

Therefore, in terms of the results analysed, it was possible to determine from a more global perspective that, from an institutional point of view, all the universities were at the 'emergency' level [56], i.e., the transition from an analogue to a digital institutional structure was not so simple, since it was a change that was forced by the situation. These universities were therefore between the first and second phases of digitisation [22], with what this entailed in terms of documentation, regulations, training spaces, staff, infrastructure, learning rates, etc. Once the information was collected, it was possible to identify the needs of each target audience, which was used to draw up the project's training plan. For the teaching staff, there were shortcomings in methodological strategies, assessment systems, use of collaborative tools and activities in a virtual context. Regarding managers, there were needs in the monitoring of virtualised activity, in quality assurance systems and in support for teachers. Students, in turn, showed needs in time management, in the use of virtual and collaborative tools, as well as in the use of the Moodle LMS. Finally, the group that showed the greatest needs was the technical staff of the universities, who showed deficiencies in various structural issues of the institutions, such as systems integration (implementation of new LMS Moodle where it did not exist), development of virtual laboratories, management of virtual repositories, licensed tools, video call systems integrated with teaching tools, remote assistance, incident management, report generator, user support and development of instructional materials (Table 8).

Table 8. Identified needs.

Players	Training Needs
Teachers	1. Methodological learning assessment. 2. Strategies in virtual environments. 3. Virtual platform use 4. Collaborative tools. 5. Technology management (virtual tools). 6. Evaluation systems. 7. Virtual context and activities.
Managers	1. Teacher guidance. 2. Quality assurance systems. 3. Virtuality monitoring.
Students	1. LMS Moodle. 2. Time management. 3. Collaborative tools. 4. Tool management. 5. Getting familiar with virtual education.
Technical staff	1. Systems integration 2. Virtual, experimental, and remote laboratories, institutional repositories of learning resources and licensed digital tools. 3. Videoconferencing systems with pedagogical tools. 4. Remote assistance. 5. Incident management. 6. Report generation from different sources (dashboard). 7. Advanced management of Moodle (Administrator level) 8. Attention to users and elaboration of training materials.

3.2. Second Stage: Design and Training

Following the training of each of the target audiences in the universities, some of the most representative results are presented below. Table 9 shows the distribution of the 83 courses designed to respond to the needs detected, in terms of the three training programs by target audience. The percentage of training for each group is also detailed. For example, 15 courses were designed for teachers and managers, distributed in two training programs: informative, in-depth and/or developmental. This meant that 18.07% of training was shared between the two groups. Teachers received 61 courses distributed in

three programs, which represents 73.49% of the total training. Students, according to their starting situation, and within the informative program, had 8 courses categorised as beginner and initiation, whose objective was the training of self-regulatory competencies, and, in the application training program, there were three specific courses designed to facilitate instrumental office automation competencies: in all, a 13.25% of the training. In addition, 12 other specific courses were programmed to train medium and advanced level digital teaching competencies; these accounted for 14.45% of the training shared with teachers. For the technical staff, we designed 11 courses divided into two programs: in-depth or development and implementation, which accounted for 13.25% of the total training.

Table 9. Training programs per target audience.

Target Audience	Training Programs	Title	Number of Courses	Duration	Percentage
Managers	Informative	Basic	4	2 h	* 18.07%
	In-depth/Development	General	11	10 h	
Teachers	Informative	Basic	4	2 h	73.49%
	In-depth/Development	General	11	10 h	
	Implementation	Specific	46	15 h	
Students	In-depth/Development	Induction	4	2 h	13.25% ** 14.45%
		Beginner	4	2 h	
	Implementation	Specific (for students only)	3	15 h	
		Specific (shared with teachers)	12	15 h	
Technical staff	In-depth/Development	General	4	10 h	13.25%
	Implementation	Specific	7	15 h	

Note: * Training courses (basic and general) for managers represent 18.07% of the courses shared with teachers (73.49%). ** The (specific) training courses for students represent 14.45% of the courses shared with teachers (73.49%).

Further results related to technological interaction, both synchronous and asynchronous training sessions are highlighted because of the conceptual and cultural meaning given by the target audience. The number of synchronous sessions depended on the course modality. In basic courses (two-hour courses), there was one synchronous session at the beginning. In general courses (ten hours long), there were two synchronous sessions, at the beginning and at the end, and in specific courses (fifteen hours long) there were three synchronous sessions, at the beginning, the follow-up and at the end. The synchronous sessions were recorded and offered on demand, complemented by forums, in which, asynchronously, there was personalised tutorial support. Table 10 shows the attendance by target audience to the synchronous and asynchronous sessions. There was a higher number of participants in the initial synchronous sessions. However, when the training process was understood to continue without the need for the teacher to be present at the same time as the student, asynchronous attendance increased. This was most clearly observed in courses with three synchronous sessions. For example, in the specific courses for teachers, to the first synchronous session, there were 1175 attendees, to the second, 828, and in the last one, only 420 people connected; however, the number of active asynchronous participants increased to 2177, with a total of 1016 teachers obtaining their course completion certificate. It is worth noting the overall low number of people trained, especially among students. Although 5121, 2809 and 3581 students were active during the training process in the beginner, introduction, and specific courses, respectively, only 71, 5 and 25 of them were certified.

Table 10. Overall results on technological interaction (synchronous and asynchronous).

Target Audience	Training	No. of Courses	Asynchronous Participation			Synchronous Participation		
			Invited Participants	Active Participants	Trained Participants	Session 1	Session 2	Session 3
Managers and teachers *	Basic courses	4	351	857	290	495		
	General courses	11	351	1389	506	726	781	
Teachers	Specific courses	34	345	2177	1016	1175	828	420
Teachers and students	Specific courses	12	5366	9490	440	38	28	6
Students	Induction courses	4	5021	5121	71	352	53	
	Courses at the beginning of the course	4	5021	2809	5	149	38	
	Specific courses	3	5021	3581	25	37	14	4
Technical staff	General courses	4	92	53	12	29	11	
	Specific courses	7	161	82	22	40	14	

Note: * Teachers and managers. In the accounting, there is only a difference when the managers only assume a management role in their institution. If they perform teaching duties, they are all included in the calculation as "teachers".

Finally, Table 11 shows the number of certificates issued per target audience. We underline the relationship between this number and the perceived needs. The training channelled through the basic and general courses was specifically aimed at managers and teachers, as it was a key training to set the foundations and build a new teaching-learning process with an innovative structure, methodology and understanding dramatically different from what had been developed at that time. In the case of the managers, all of them completed the basic and general training course, achieving 210 certificates. The teachers, far from our objective, focused more on more practical and applicative training, completing almost 57% of their training in specific courses, with 1087 certificates. The other 43% was distributed between basic and general courses, with 827 certificates. Students, on the other hand, leaned significantly towards more applicative training with 79.1% of the total, 174 out of 220 certificates; the rest were distributed between courses classified as induction and initiation. Similarly, technical staff also completed a higher number of courses of this type, with 64.7% of the total.

Table 11. Target training audience. Number of certificates issued.

Target Audience	Roles	No. of Issued Certificates	Course Category	No. of Certificates per Course	%
		Global			
Managers	Administration and academic management	210	Basic General	56 154	26.7% 73.3%
Teachers	Tutorial, research, teaching and social functions	1914	Basic General Implementation	321 506 1087	16.77% 26.44% 56.8%
Students	Learning and research functions	220	Induction Initiation Implementation	41 5 174	18.63% 2.27% 79.1%
Technical staff	Support in virtual space design Support in technical incidents	34	General Implementation	12 22	35.29% 64.7%
Total		2378			100%

Comparing these results with Table 8, which shows the training needs detected in each group, the reality described above is a true reflection of these needs. Teachers, students, and technical staff focused their attention on practical and applied training (implementation courses), seeking to enrich their teaching practice, their academic and teaching work and the technical tasks involved in direct relations with other university groups.

3.3. Third Phase: Monitoring and Techno-Pedagogical Accompaniment

These are the most representative results of the third phase to make it possible to analyse what has been achieved.

PMESUT defined the components that make up the complete virtualisation of each model course in this program: virtualised syllabus, learning guide, implementation in the LMS, monitoring strategy and student support. Each of these is described below with the adaptations made by the Consortium:

1. **Virtual syllabus**. To improve teaching practice, it is essential to have a syllabus that guarantees the student a detailed understanding of the course. For this purpose, the syllabus model recommended in Guide 3 for Capacity Building of Teachers and Administrative Staff developed by MINEDU during the pandemic was followed, as it accurately presented the necessary guidelines for virtualisation, combining the specificity of a regular syllabus and the detail of a Learning Guide.
2. **Learning Guide:** As a complement to the syllabus, individual Learning Guides were prepared for each course.
3. **Implementation in the LMS:** This criterion defines a minimum structure to implement contents in the virtual learning path: In Peruvian universities, courses are divided into two cycles, each of which is 16 weeks long. Therefore, a course is considered to have been implemented in the LMS (Moodle) when all weeks are migrated with the following information: welcome and course content, access to videoconference, complementary material, bibliographical references, and forum.
4. **Strategy for monitoring and support of students.** This component focuses on the forum and virtual tutoring hours or spaces.

4. Forum

There are two different forums as a channel for monitoring and supporting students.

- **General Forum (doubts)**

In this context, it was defined as a meeting place to solve general doubts on the course (technical, instructional aspects, etc.). Therefore, it is not a formative forum that has a significant influence on the student's qualification. The general forum can be found on the main buttons of the course in Moodle.

It was recommended to start with a motivational message and to consider the netiquette so that the communication is appropriate and respectful.

- **Formative forum (discussion)**

This forum has a weight in the evaluation of the student, so it was suggested to consider the following recommendations:

1. Define the topic.
2. If students need to review a reading or video to respond in the forum, this input should be indicated within the forum, not as an external resource.
3. Delimit an approximate maximum length in lines or number of words or characters, to contribute to training the students' capacity for synthesis when communicating their ideas.
4. Establish an evaluation instrument to grade the forum (if it is part of a graded activity).
5. Netiquette rules for communication between students.

As this was the first time that teachers and students were using an academic forum, they were trained and educated on the rules of netiquette to ensure respectful and appropriate coexistence.

Mentoring Hours

Tutorial action was one of the major challenges of this program. For that reason, it was addressed during the third stage of the project. As part of the implementation process, teachers had to include office hours in their syllabuses and virtual classrooms. This way, students could officially count on these spaces and organise their time. In addition, it was suggested that they be thematic to guarantee a successful learning route [57].

On the other hand, regarding the teachers who have participated in the techno-pedagogical support plan, synchronous group sessions have been held, as well as individual sessions on demand. Asynchronous monitoring has been maintained at the universities until 3 January 2021.

In addition, a closing and handover session took place on 30 December 2020 in which all participants expressed their satisfaction with the project and the consortium. They mainly indicated time as a limiting factor for such an ambitious project. However, they commented that it has helped them to become aware of the importance of addressing the change of model, strategies, and methodologies in e-learning. It is not only about digital competencies that are important to guarantee the continuity of the virtual/online educational service.

To guarantee a techno-pedagogical support, the coordination of the project trained the trainers on different occasions.

Finally, Table 12 shows the number of courses virtualised by the consortium (partially and totally).

At the end of the monitoring and techno-pedagogical support phase, we produced a virtualisation guide so that the universities could scale up the process autonomously in the future. It includes the main milestones for a correct virtualisation process, as shown in Figure 6.

Table 12. Virtualised courses.

Total Number of Courses to be Virtualised	Number of Courses Partially Virtualised *	Number of Courses 100% Virtualised	Number of Teachers Involved
210	39	101	118

* Courses partially virtualised: Algorítmica y programación; Biología general; Química ambiental; Interculturalidad y desarrollo; Etnología; Introducción a la investigación científica; Cálculo I; Física I; Estadística General; Etnología de materiales; Análisis Matemático I; Física General I; Química General; Biología General; Análisis matemático; Ecología y medioambiente; Matemáticas I; Métodos y Técnicas de estudio; Introducción a la investigación científica; Realidad Nacional y Derechos Humanos; Investigación social cuantitativa; Filosofía y Lógica; Análisis y diseño de experimentos; Ecuaciones diferenciales; Resistencia de materiales II; Evaluación de impacto ambiental; Programación para ingeniería; Tecnología de control de la contaminación del aire; Físico-Química; Microbiología I; Matemática IV; Análisis Matemático I; Astronomía y Geodesia satelital; Dasometría y Dendrometría; Economía ambiental; Estadística y Probabilidades; Lengua y cultura nativa I; Sistemas de representación; Tecnología de los materiales.

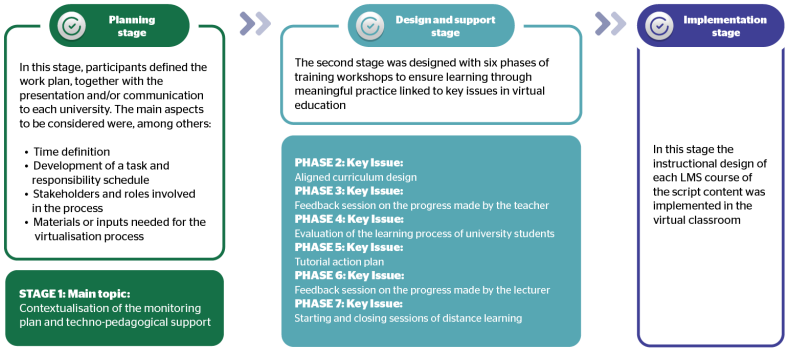

Figure 6. Stages of the virtualisation process.

5. Discussion

The results are discussed below in comparison with other research, looking for similarities and differences.

5.1. Diagnosis

Analyzing the results of the diagnosis phase, it was possible to observe that, on the one hand, the data obtained in the organisational, technological and competence dimensions of the participating universities showed the difficulties they faced in undertaking the change of teaching modality; and, on the other, the difficulties of the diagnostic process itself: it was carried out virtually (online), there was a cultural and contextual distance, it was conducted from another continent, and some of the instruments used were developed by PMESUT and MINEDU respectively (the diagnostic matrix and the GAMOD tool).

Addressing the first question, it was observed how the transition from face-to-face teaching to a distance learning model presents different barriers and obstacles to overcome, including external constraints, such as difficulties of internet access, combined with internal factors, such as the institutions' infrastructures, virtual classroom management and human resources [58]. All these issues emerge in the results obtained, all six universities being characterised by a lack of human, technological and organisational resources. In fact, two of the six universities had a weak LMS that they had to migrate to open-source platforms such as Moodle, which meant that this process involved training both the technicians and the rest of the educational communities that were to benefit from the new resource. Regarding the competence dimension, this transition process highlighted the instructional and technological capacities and skills of managers, technological staff, students, and university teachers, for whom it was necessary to develop an extensive training program to strengthen and expand digital competencies, responding to the challenge of changing to a distance learning mode [59].

In terms of diagnosis development, there was a culture clash between the consortium and the universities. The perception of e-learning methodology on both sides was very different. It was evident that the universities were not prepared for the change in which they were involved in terms of methodology, infrastructure and, above all, the times set for teaching and learning [60].

In the first diagnostic stage, we found that all the universities were in a state of national emergency due to the COVID-19 situation, having to make an immediate transition of the teaching modality to ensure the continuity of the educational service [61]. The emergency virtual modality should be understood as the adaptation of materials, content, and technology to be able to provide continuous educational service in the short term. According to experts, this modality does not have all the minimum characteristics of distance education in any of the three dimensions that define these minimums: neither from the pedagogical point of view of achieving valuable learning (instructional component), nor in the social dimension, expressed in the dialogue component that reinforces the fact of educational interaction, nor in the technological dimension, which assumes the mediated component, required when the teaching act takes place with teacher-student separation [56] (p. 24).

5.2. Design and Training

The overall objective of the training plan was for participants to build their own learning pathway according to their needs, as well as to scale it over time [39]. It is confirmed that the needs identified were met after the training, however partially. The number of basic and general courses should have been higher to deepen a better and greater understanding of this new educational reality of virtual teaching, which was proving difficult to assimilate, understand and implement [6,7,62–68].

Until 2019, the lecturers at the six Peruvian universities had carried out their work in a face-to-face context, as required by the regulations in force in their country and at their university. The need for a shift in teaching methodology and in the instructional models involved linked to virtual environments became visible, as well as the need to

incorporate and train digital competence in the educational context [68–70]. Therefore, at the starting point of the assessment, with the intention of understanding and promoting tacit thinking [55], the following question was discussed: What is a digital teacher like? How does he/she feel, and how does he/she act on a day-to-day basis?

Therefore, the approach to the teacher training needs in a distance learning environment was based on the analysis of the professional profile. The competence profile of the university teacher [71] is divided into two: competencies related to the teaching function and competencies related to the research function. The university lecturer considers the tutorial function as a secondary function, but tutoring is an intrinsic part of the teaching-learning process, and is a key moment for students [72–74]. We advocate the inclusion of the tutorial function as a comprehensive part of the university teaching function. The pedagogical support model during training made the figure of the tutor visible as a reference in the virtual space [12]. It does not mean turning the teacher into the student's counsellor, but rather as a companion and guide for their learning [53,71,75].

University managers, including academics and administrative staff, required training in integral quality systems and teaching support plans, among other topics (Table 8). Due to limitations attributed to the overload of tasks caused by the pandemic, a minimum number of courses were held. The digitalisation of the university was at the heart of their concerns, as well as the crisis generated and the lack of knowledge about the future [22,66,67,76–79]. Intercultural universities have faced unique situations that have been responded to with a careful look at cultural and social diversity, respecting the idiosyncrasy of the other and the meaning of otherness [14,80]. A study carried out by Jimenez and Valdés [81] warned of the consequences for countries of neglecting minorities at risk of exclusion in educational environments. Ramón [82] points out that the pandemic will leave its marks on education, as on any other social sector, with digital marks in an increasingly digital world.

University students were one of the least well-trained groups. They reported difficulties related to lack of digital skills, and low autonomy and self-discipline, both necessary skills to learn in virtual environments [23,25,28,47,50,56,83–88]. They were one of the groups that received the least amount of training. The attributable causes were due, on the one hand, to the university communication strategy; although broad in terms of the channels used, the most important of all, which we place in the virtual classroom, was not used in a well-planned way. The teacher was not prepared to carry out the proactive tutorial function that is so useful in virtual environments [75], and, on the other hand, the student lacked time-planning strategies, and therefore missed out on the training opportunities necessary for the development of a distance learner's competencies [56]. In addition, poor Internet connection and lack of technological resources and inadequate use [68,89].

The technical staff was the best trained group. As pillars of the universities, they were aware of their role in the change they were immersed in, and the challenges involved in moving towards a digital university [79].

The results, overall, indicate a great variability of access to training for the target audience, with teachers and technical staff being the users who obtained the highest number of certificates. At the same time, from a longitudinal analysis, the form of access was discontinuous and variable, showing over time, a more continuous line; due, in short, to the effect of digital competence training as participants in online learning contexts [23].

The general and most evident difficulty of the target audience was the low participation during the asynchronous sessions, despite the increase of participants as the courses progressed, as well as the decrease of audience flow in the synchronous sessions. These details are discussed in similar studies carried out by García Aretio [56], which indicate that dropout in distance learning environments can be attributable to specific and very diverse causes, referring to students, teachers, and institutions.

The training plan was designed considering this fact, as well as others collected in related research [39,75,90–92], and therefore, the following measures were taken as the main ones to mitigate possible effects and subsequent consequences:

- Measures focused on time management and organisation: planning and alternation of synchronous and asynchronous training sessions in the courses; deferred broadcasting of synchronous sessions; systematic communication about the weekly training schedule through virtual communities.
- Measures for guidance and support to avoid the feeling of loneliness and the fear of failure: the figure of the tutor and the use of constant feedback [52].
- Measures aimed at strengthening intellectual strategies and study techniques: curricular documents and materials were designed considering the psycho-pedagogical principles of adult learning.
- Measures to train digital competencies: the courses aimed at training activities that required different levels of academic and digital performance.

5.3. Techno-Pedagogical Support and Follow-Up

During this stage, communication has been more constant and has even involved the Head of the Consortium, PMESUT and DIGESU, generating communicative spaces with the different universities to sincerely understand the real participation of the educational community in the different activities in this phase.

There has been low participation in the process of course virtualisation on the part of teachers and managers due to time constraints and other burdens inherent to the teaching period. Various meetings and agreements have been made to increase this participation. Some of the measures include:

- Specific actions: collective informative, training and guidance sessions, recorded in the meeting minutes with teachers and academic managers.
- Specific and individual asynchronous communications, necessary to inform and advise the teachers in charge of the virtualisation of the model courses in an extraordinary way.
- Extension of the delivery date for virtualised courses.
- Certification of digital competencies as an incentive for the work accomplished.

Thus, teachers demonstrated a commitment to change and accepted the challenge, despite not having enough knowledge and experience to deal with teaching in virtual environments.

According to Tejada and Pozos [93], the new scenarios are giving rise not only to a modification of existing competencies, but also to new roles and new professional competencies.

Virtual teachers must acquire different functions, competencies and assume the change of paradigm that higher education has undergone in recent times. The functions of the e-tutor include social, pedagogical, facilitating, design, technical, planning, mentoring, and tutoring [94].

Tutorial action, aimed at monitoring and supporting students, has been the weak point in this process. The tutorial function is conceived by different authors as "the guiding relationship of one or several teachers with respect to each student in order to understand the contents, the interpretation of the procedural descriptions, the appropriate time and form for carrying out work, exercises or self-assessments, and in general for the punctual and personalised clarification of any type of doubt" [95] and not only as a space for solving doubts during office hours. Conceiving this action as a process of guidance that is intentionally designed and essential for a student's learning requires a longer period than we had in this project.

On the other hand, we provide information obtained from surveys completed by teachers and students from the participating universities. One of the objectives was to find out the perception of students and teachers regarding their virtual courses and their benefits.

We provide information obtained from surveys completed by teachers and students from the participating universities (Table 13). One of the objectives was to find out the perception of students and teachers regarding their virtual courses and their benefits.

Table 13. Teachers and students' perception.

	Good/Excellent	Medium/Good	Not soBad/Medium	Bad/Poor
Teacher profile: Perception of your students' achievement and learning	45.1%	51.08%	3.06%	0.76%
What is the overall rating of your virtual courses?	18.2%	50.5%	26.75%	2.8%

Based on the results obtained, we made some recommendations derived from the counselling and support process carried out, such as: the need to temporise certain actions to involve teachers, to strengthen teacher training in technological and pedagogical competencies, and to develop a virtualisation process that allows the transition from face-to-face to virtual teaching, among others.

Below, Table 14 contains a series of recommendations to conclude the discussion section:

Table 14. Recommendations.

Recommendations		
Diagnostic	**Training Plan**	**Techno-Pedagogical Support**
• Time management • Involving teachers vs. recognition • Direct communication with students • Integrate quality and ICT departments with the teaching area	• Time management • Pedagogy first, technology second • Respecting learning times • Focusing on training beyond emergency adaptation • Strengthening pedagogical skills	• Time management • Virtualising to transform education • Ethical use of virtual communication • Aligned curriculum • Process for teachers, quality management and ICT staff

6. Conclusions

Higher University Education in the face-to-face modality has become a new scenario that has undergone a change based on the commitment of the institutions in response to the COVID-19 pandemic situation. Peruvian public universities have developed an organisational strategy to reconfigure the teaching modality, under the vice-ministerial resolution of the Ministry of Education (No. 085-2020) that provided guidelines for the continuity of the educational service, which have shown the need for planning advice and support for change.

In the context of emergency and virtuality, the Peruvian national universities participating in the project have faced the challenge of providing continuity to the virtual/online educational service considering the external technological, geographical and competence variables of the actors involved, which have influenced the process. The most notable characteristic was that the universities were not methodologically prepared for the change. They all had the common feature of not having an educational model designed for a virtual/online format.

The greatest need they have shown is methodological strengthening and techno-pedagogical competencies to offer meaningful virtual learning for their students to reach the most disadvantaged and isolated areas in the Amazon region. The lack of connectivity was a reality, as was the digital divide existing in their community, which serves a large indigenous population.

Training plans have been a key strategy in the process, but training works if the universities support the training process. Therefore, each member of the university educational community has managed their time to receive the training according to their needs and professional performance; these trainings have also been accessible to ensure a greater reach and enhance a process of awareness over time in the university communities and have become a repository of asynchronous training for the self-training of teachers.

Digital teaching competence has been a key milestone in the teaching-learning process in a virtual environment regarding what we call the techno-pedagogical aspect. It is recommended that teachers improve their teaching performance with synchronous and asynchronous tools for the work process in the virtual community with their students. The university teachers, brilliant in a face-to-face context, in their academic routine, feel overwhelmed by the challenge of a virtual/online context, and therefore, they must improve their competencies in this new environment.

In the virtualisation process, university teachers have proved to be the main promoters of change; their involvement and motivation have been the cornerstone in the virtualisation of their subjects. Lecturers from the six universities together with the academic coordinators and the technological staff of the consortium have developed personalised meetings, support and resources that have led to the most generous product of the project: the virtualisation of the model-subject courses.

In conclusion, the role of the coordination of the Consortium in this project has been fundamental to develop a change of educational modality and to strengthen technological and pedagogical competencies. This will result in greater efficiency and better development of the quality distance education modality in a group of Higher Education institutions which are in the so-called basic and/or initial stage in the transition process to a virtual/online methodology, i.e., in the framework of an emergency virtual education.

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