Characterization of the Assessment of University Education Learning in Times of COVID-19 Based on a Systemic Approach

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Abstract

The coronavirus pandemic affects almost all countries with an unknown duration and the activities of Peruvian universities have had to adapt to non-face-to-face education, having emerged new demands that are reflected at the level of the processes. In this sense, in the field of university training it is important that teachers acquire mastery in the application of relevant methodologies and tools for the remote adaptation of academic activities and the evaluation of learning that ensure results equivalent to those achieved with the evaluation face-to-face. For this purpose, it is vital to check the effectiveness on the learning evaluation side. Considering, given the continuity of the health emergency, that the institutions must maintain the educational service they provide to society and, at the same time, be able to ensure compliance with the accreditation criteria, it is proposed to ensure educational quality through a systemic approach to identify the components involved and their implementation considering the teamwork of teachers and authorities. The authorities have to lead the project in a participatory way and incorporate the best practices that demonstrate its effectiveness since there are no previous experiences.

Keywords
Quality assurance, Systemic approach, Quality education, Learning assessment, Distance education.

1. Introduction
Since 2020, as is known, the country is in a health emergency motivated by the coronavirus pandemic that has significantly altered the lives of citizens and the various activities in all sectors of society, including those that they are developed in the university higher education institutions.

In Peru, by means of a Presidency Resolution of the National Superintendency of Higher University Education-SUNEDU (2020), the criteria for the supervision of the adaptation of non-face-to-face education were approved, on an exceptional basis, of the subjects in the different Faculties and Graduate Schools, as a consequence of the health emergency measures in the country; constituting the legal framework that allows the temporary development of non-contact classes, exceptionally, in university academic programs.

In this context, the Ricardo Palma University has had to implement the non-face-to-face teaching modality whose activities are carried out online or synchronously and offline, that is, asynchronously, meaning a new situation to which our academic community has to adapt and the institution itself is also responsible for strengthening the culture of evaluation of its administrative and academic management as postulated in the work of Aguilera (2017).

So far, the problem is clear. Now the topic focuses on the possibilities as alternative solutions. With this purpose and from the outset, the demand for training that has been taking place since April 2020 has been experienced, to which the majority of teachers have reacted favorably, showing not only their institutional identification but also their commitment to provide a better education in unexpectedly different circumstances, which implies at the same time an unexpected renewal of the profile of university teachers. On the other hand, as a characteristic that should be highlighted in today's youth, students are close to new information and communication technologies as part of their environment, which significantly facilitates their adaptation.

In the context described, it is estimated that the main solution must come from quality assurance, according to the Council for Evaluation, Accreditation and Certification of the Quality of University Higher Education-CONEAU (2010) understood as a systemic approach to guarantee quality of the processes and results of higher education institutions.

1.1 Objectives
Ensuring the quality of the quality of professional training by increasing the reliability of learning results, through the use of synchronous evaluations in the educational programs of the Faculty of Engineering, as part of the systemic approach to the adaptation of non-face-to-face educational activities.

2. Method's and Analysis
According to Agudelo (2012) a process is a set of sequential or parallel activities that a producer executes on an input, adds value to it and supplies a product or service for an external or internal client, this being the original basis of quality.

The diversity of approaches and quality criteria make it necessary to scale the frame of reference in order to put into perspective what the university should be and what it should do, as the study by Villarroel (1994) analyzes it, and from there try to approximate a definition about educational quality for a university institution. As it is argued, the duty of an institution is generated in two fundamental sources: its nature and its context. Based on the above, the degree of relevance between institutional behaviors and the essential and contextual characteristics of the university considered is conceptualized as university quality. In this sense, the quality would come to be the congruence between the should be and do of the institution and its behavior. To the extent that institutional behavior approaches its duty to be, its quality will increase, consequently, institutional quality is sought or achieved by trying to reduce the gap between that duty and institutional behavior. Nor should the context concern be ignored because in the current circumstances the Covid 19 pandemic has drastically changed the life and behaviors of our society.

Being in a situation characterized by the health emergency, an aspect that is not being properly analyzed is the issue of the cost of educational services. On the particular Cuatrecasas (2010) argues that at the beginning, it is more convenient and less expensive to incorporate quality from the design of products and processes than to do it in later stages. In this regard, on the contrary, the aforementioned circumstances have only allowed the adaptation of the activities to the non-face-to-face way.

The relationship between the quality management approach and organizational performance from the perspective of resources was studied by Cruz Ros (2001) examining how to establish the impact that quality management systems produce on organizational performance due to their contribution to the generation of distinctive competencies. As might be expected, despite the fact that habitual academic activities have been adapted to being absent, no effort should be spared in achieving the competencies of professional training.

For the aforementioned purpose, quality assurance must be viewed at the process level. In the educational process, the curricular plan or study program, the educational standards, the teaching staff, the teaching methods, the educational materials, the students, the infrastructure constituted by the classrooms, can be identified as components or input factors, laboratories, workshops, virtual or technological platforms and information and communication networks, as well as for the environment. To this contextualization should be added identifying as a necessity the establishment of technical coefficients, in a similar way to the initial education stage in which the concept of structural quality is used, in which Falabella, Cortázar, Godoy and González (2018) refer to the most stable aspects of the environment in which education and care are linked.

The interaction of the indicated components or factors generates the educational service understood as a conversion cycle that results in student learning. It is important to highlight that in Peru according to the Ministry of Education (2016) there is a quality assurance policy that serves to guide the objectives to be achieved by university-level educational institutions.

It is well known that what has changed the most as a consequence of the lack of presence in educational activities is the role and profile of the teacher, the teaching methodologies and the intensive use of virtual platforms and information and communication networks. The subject of the environment also deserves an additional mention, whose change has been substantive from face-to-face interaction to virtual contact based on communication, opening an

immense range of possibilities to study the emotional implications from the psychological perspective and its effects on learning.

It is not ruled out that from a more reflective analysis all the factors or components have undergone qualitative changes, however, the adaptation to the non-face-to-face educational service requires the articulation of all of them through the educational norms that make it possible to function systemically.

Within the problem described, a constant review of the processes using the Business Process Management (BPM) approach is considered important, which according to Garimella (2008) is defined as a set of methods, tools and technologies used to design, represent, analyze and control operational business processes to improve performance that combines information technologies with process and governance methodologies in order to promote effective, agile and transparent business processes. The relevant processes for the case are presented below in the Flow Diagram of figure 1.
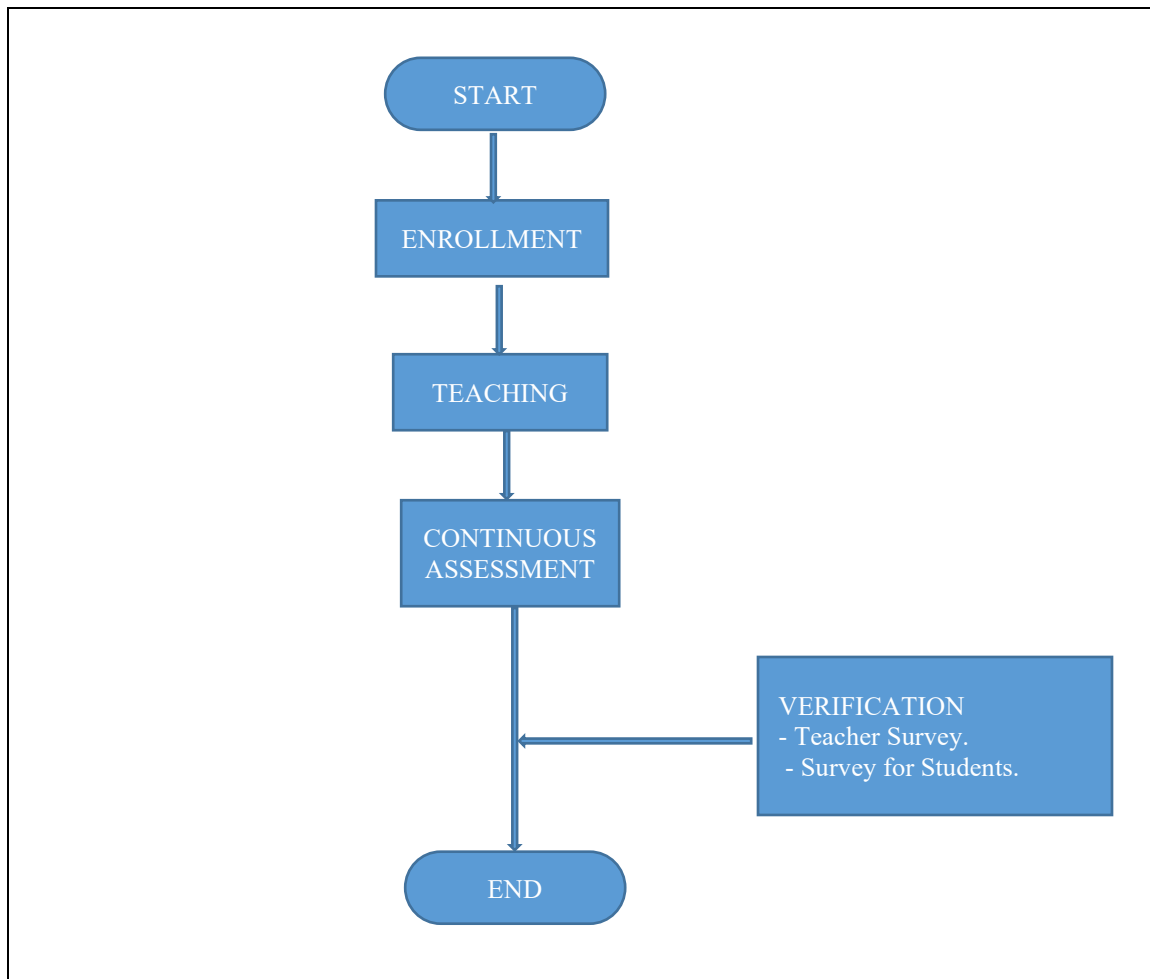

Figure 1. Processes Related to the Non-Presential Assessment.

As an essential component to achieve competencies, according to Erazo (2012), academic performance is understood as the system that measures the achievements and the construction of knowledge in students, which are created by the intervention of educational didactics that are evaluated through of qualitative and quantitative methods in a subject. Its objectivity lies in the fact of evaluating the knowledge expressed in notes, but in reality, it is a phenomenon with a complex characteristic resulting from subjective characteristics, which are necessary to understand its link to educational action. This makes the suspicion that in non-face-to-face education such complexities and subjective characteristics must have multiplied.

For this purpose and as long as the educational activities are of a non-face-to-face nature, the system and the types of evaluation had to be defined. In this way, the Continuous Evaluation system was institutionally established, implying that the modalities of the evaluations could be synchronous or asynchronous as defined in the work of Quesada (2006).

The most complex process continues to be that of learning assessment, which over time has had to evolve to achieve results that are close to those of the face-to-face modality. Table I shows how synchronous and asynchronous evaluations had to be distinguished, as well as the use of surveys as a means to verify the application of evaluations with online instruments.

Table 1. Comparison of processes during the remote stage

Semester 2020-I	Semester 2020-II	Semester 2021-I
Enrollment	Enrollment	Enrollment
Teaching	Teaching	Teaching
Continuous assessment. - Synchronous. - Asynchronous	Continuous assessment. - Synchronous. - Asynchronous	Continuous assessment. - Synchronous. - Asynchronous
Survey for Students.	Teacher Survey	Comprobación: - Teacher Survey. - Survey for Students.
	Survey for Students.	
Records.	Records.	Records.

In the 2020-I semester, through a directive of academic standards, it was established that the assessment must be online. The insufficiency of the regulatory framework and the limited supervision by the programs, in fact, determined that the evaluation of learning depended almost exclusively on the discretion of teachers. During the semester, a survey was applied to teachers to monitor the remote adaptation of academic activities.

In the 2020-II semester, the academic standards directive established that teachers must place in the Digital Portfolios of the Program the digital files of the written evaluations developed by the students with the highest marks, for each learning unit, and must accompany the corresponding topic. If the evaluation was carried out through the Online Questionnaire, the teacher must present the report issued by the system with the results. As can be seen, in this semester the regulatory framework was more complete, but teachers' compliance was low, making greater supervision of most programs necessary. During the semester, surveys were applied to teachers and students to monitor the remote adaptation of academic activities.

For the 2021-I semester, the academic standards directive established with precision the definitions of synchronous and asynchronous evaluations, as well as the obligation of teachers to take at least one synchronous evaluation in each learning unit and to place in the Digital Portfolios of the Program the digital files of the written evaluations developed by the students with the highest marks, for each learning unit, which must accompany the corresponding topic. If the evaluation was carried out through the Online Questionnaire, the teacher had to present the report card issued by the system as a result. As can be seen, in this semester the regulatory framework was more complete, but the compliance of the teachers, according to the result available to date, was 23%, which is very low and would be revealing little emphasis on supervision by the program. During the semester, surveys were applied to teachers and students to monitor the remote adaptation of academic activities.

At the end of the 2020-I semester, the need to increase the effectiveness of learning assessments had already been visualized. For this purpose, and given that positive experiences had been achieved in the monitoring of remote adaptation through surveys of student delegates, in the 2020-II semester the first survey was applied to teachers in which included collecting their perceptions about the evaluations.

At the beginning of the 2021-I semester, a measurement was made of the average approval levels, resulting in 73% in the face-to-face stage and more than 90% in the non-face-to-face stage, showing an apparent improvement that needed to be confirmed. For this purpose, by way of verification, some questions were linked between the survey of student delegates and teachers

Specifying what has been described, the experiences of non-face-to-face education in the field of learning evaluation, based on apparently favorable results that had to be corroborated, for which, from a systemic perspective, the design of the delegate surveys was addressed of students and teachers, linking the questions in such a way that the objective could be achieved without the need to resort to a significant use of resources. As can be seen, the method used systematically focuses on the evaluation of learning in the non-face-to-face stage with surveys of student delegates and teachers, as a verification mechanism regarding the use of online questionnaires.

The Faculty of Engineering has 5 programs. To keep confidentiality, only the data of the Mechatronics Engineering Program will be made explicit, while the rest will be treated generically as necessary. The unit of analysis will be taken as the group of teachers and students, in order to assess their specific situation in each variable considered and, at the same time, compare with the general trends within the Faculty of Engineering, constituting a contribution to a plan of systematized action as recommended in the study by Farfán and Dávalos (2021) not only for accreditation, but also the continuous and permanent improvement of the quality of educational programs that are defined as a priority in the face of the consequences of covid 19 as highlighted the Ministry of Education of Chile (2020).

3. Results

In order to know the first results of the non-face-to-face adaptation regarding the evaluations, during the second semester of 2020 a survey was applied to teachers, the results are displayed in Table 2 from which the following questions have been selected for this occasion:

1. In relation to the Online Questionnaires, which constitute the main tool for evaluating learning in non-face-to-face education, check as appropriate: Master, Apply, Requires Reinforcement and Does not know.
    The results were 49, 31, 17 and 3%, respectively.

Table 2. Use of online questionnaires
Expressed as a percentage (%)

ENGINEERING	Dominate	Applies	Requires reinforcement	Does not know
PROGRAM 1	54	17	25	4
PROGRAM 3	31	46	15	8
PROGRAM 2	42	34	20	4
PROGRAM 4	64	28	8	0
PROGRAM 5	55	28	17	0
AVERAGE	**49**	**31**	**17**	**3**

Source: Results of the 2020-II Survey to Teachers of the Faculty of Engineering

According to the results obtained, on average, 80% of the teachers stated that they Master and Apply the Online Questionnaires. On the contrary, 20% of the teachers declared that they require reinforcement and do not know the indicated assessment instrument. On the other hand, in Engineering Program N ° 5, 83% of the teachers stated that they Master and Apply the Online Questionnaires, reducing the options of Require reinforcement and Do not know to 17%.

2. (Only if you apply the Online Questionnaire). One way to increase the effectiveness of the Online Questionnaires is to condition its application to sequential navigation (review), allow only 01 attempt to solve and that the sending of the solution developed by the student is carried out automatically, in addition to granting a reasonable time. Check the option as applicable: Higher, Applicable, Requires Reinforcement (Reinforcement) and Unknown. Unknown. The results are shown in Table 3, the average results were 21, 53, 19 and 7%, respectively.

Table 3. Efficiency in the application of online questionnaires
Expressed as a percentage (%)

ENGINEERING	Superior	Applies	Requires reinforcement	Does not know
PROGRAM 1	17	54	25	4
PROGRAM 3	15	54	15	16
PROGRAM 2	32	48	14	6
PROGRAM 4	36	44	20	0
PROGRAM 5	5	67	22	6
AVERAGE	**21**	**53**	**19**	**7**

Source: Results of the 2020-II Survey to Teachers of the Faculty of Engineering.

As can be seen, regarding the effectiveness in the application of the online questionnaires, 74% of the teachers on average declared that they have a Superior form or that they Apply as recommended. In the opposite sense, 26% of the teachers indicated that it requires reinforcement and does not know. In Engineering Program No. 5, such percentages are 72 and 28% respectively, slightly signifying a lower domain in the effective use of online questionnaires.

In the second semester of 2020, a survey was also applied to the student delegates, from which in a similar way for this occasion, the following questions have been selected:

1. In Table 4, to date, do you perceive in the course an adequate command of the Blackboard Collaborate Ultra platform for non-face-to-face classes? Check as applicable: Strongly agree, Agree, Disagree, and Strongly disagree. The average results were 56, 42, 2 and 0%, respectively.

Table 4. Platform domain
Expressed as a percentage (%)

ENGINEERING	Strongly agree	Agree	Disagree	Strongly disagree
PROGRAM 1	58	40	2	0
PROGRAM 3	57	40	3	0
PROGRAM 2	57	43	0	0
PROGRAM 4	55	45	0	0
PROGRAM 5	53	40	7	0
AVERAGE	**56**	**42**	**2**	**0**

Source: Results of the 2020-II Survey to Delegates of Students of the Faculty of Engineering.

According to the results obtained, on average, 98% of the student delegates declared that they Completely agree and agree, that an adequate mastery of the Blackboard Collaborate Ultra platform is perceived in the course for non-face-to-face classes. On the contrary, only 2% of the student delegates declared to be in Disagreement. In Engineering Program 5, the indicated percentages are 93 and 7% respectively, reflecting a lower appreciation with respect to the trend of the whole.

2 .   Do you agree that in the non-face-to-face teaching modality, the student must reinforce his proactive, collaborative and ethical attitude towards learning? Check as applicable: Strongly agree, Agree, Disagree, and Strongly disagree. and strongly disagree. The results are shown in Table 5, the average results were 67, 32, 1 and 0%, respectively.

Table 5. Proactive, collaborative and ethical attitude towards learning
Expressed as a percentage (%)

ENGINEERING	Strongly agree	Agree	Disagree	Strongly disagree
PROGRAM 1	82	18	0	0
PROGRAM 3	70	28	2	0
PROGRAM 2	64	36	0	0
PROGRAM 4	66	32	2	0
PROGRAM 5	53	47	0	0
AVERAGE	**67**	**32**	**1**	**0**

Source: Results of the 2020-II Survey to Delegates of Students of the Faculty of Engineering.

In relation to the fact that in the non-face-to-face teaching modality, the student must reinforce his proactive, collaborative and ethical attitude towards learning, on average 99% of the students stated that they are Completely in agreement and In Agreement. On the other hand, only 1% of the students disagree. In Engineering Program N ° 5, the indicated percentages are 100% Completely agree and agree, reflecting a concordant appreciation regarding the trend of the whole.

Until now, there was a general impression that the teachers, despite the urgency, had achieved an adequate mastery and an effective use of the Blackboard Collaborate Ultra Platform and; On the side of the students, a favorable perception had also been achieved in the remote adaptation of academic activities and that, in addition, they declared in an absolute way a proactive, collaborative and ethical attitude towards learning, both as a general trend and in the Program of Engineering N ° 5.

In Table 6, shows the results for the first semester of the current year 2021, surveys were also applied for teachers and student delegates, with the same purpose of monitoring the remote adaptation of academic activities and mostly using questions similar to those of the previous year. On this occasion, the indicated surveys were designed linking some questions between the two as a check.

Table 6. Proactive, collaborative and ethical attitude towards learning
Expressed as a percentage (%)

ENGINEERING	More than two times	Twice	One time	Never
PROGRAM 1	42	0	5	53
PROGRAM 3	44	16	9	31
PROGRAM 2	48	16	8	28
PROGRAM 4	36	39	19	6
PROGRAM 5	46	11	12	31
AVERAGE	**43**	**16**	**11**	**30**

Source: Results of the 2021-I Survey to Delegates of Students of the Faculty of Engineering.

On this occasion, the student delegates were asked if the teacher had carried out an evaluation using the online questionnaire through the Blackboard Collaborate Ultra platform. In this regard, the student delegates stated that on average 41% of the teachers had never or only once applied an online questionnaire during the learning assessments in the semester. In Engineering Program No. 5, 43% was obtained, also reflecting an appreciation consistent with the trend of the whole.

It is important to highlight that the response of the student delegates made it possible to make visible a deficiency that was not known and that constitutes a risk that has an impact on professional training.
The Engineering Program N ° 5, in the variables that have been analyzed, reflects a high coincidence with the average trend of the set of programs of the Faculty of Engineering.

4. Conclusions

• The quality assurance of professional training will depend on the systemic approach applied to the remote adaptation of educational activities, considering all the factors or components involved and their implementation considering the teamwork of teachers and authorities.

• The multifactorial nature of educational processes is confirmed, in whose systemic approach, elements such as periodic surveys for teachers and students must participate as part of the monitoring mechanisms, norm as mandatory the use of online questionnaires as part of the instruments of periodic evaluation of learning, supervising the teaching tasks directly and randomly by sampling the total of teachers in each semester. With special emphasis, it is recommended to consider a training program that includes evaluation for teachers to deepen the use of methodologies and tools for teaching and evaluating non-face-to-face learning, trying to generate an environment of collaboration and support between authorities and teachers, which form the basis for ensuring quality professional training.

• The management in charge of the authorities has to lead the project in a participatory manner and incorporating the best practices demonstrate their effectiveness, considering that we are facing an uncertain situation, there are no previous experiences and there are growing needs and expectations in society.

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