Research Article

Learning assessment challenges from students and faculty perception in times of COVID-19: A case study

Katherina Gallardo [1]

[ID] 0000-0001-8343-9518

Leonardo Glasserman [1*]

[ID] 0000-0001-7960-9537

Nohemi Rivera [1,2]

[ID] 0000-0003-4890-671X

Lizette Martínez-Cardiel [1,3]

[ID] 0000-0002-6130-1507

[1] Tecnologico de Monterrey, Monterrey, Nuevo León, MEXICO
[2] Universidad Autónoma de Yucatán, Mérida, Yucatán, MEXICO
[3] Universidad Autonoma de Barcelona, Barcelona, SPAIN
* Corresponding author: glasserman@tec.mx

ARTICLE INFO	ABSTRACT
	A mixed-method study about the perception of students and faculty around learning assessment practices was conducted in a multicampus competency-based approached Mexican private university. The objective was getting new knowledge about higher education community perception around learning assessment practices, learning outcomes production and how authentic assessment was driven while working on different modalities during the pandemic: remote learning, synchronous hybrid learning, alternate hybrid learning, and on-site modality. A questionnaire, and an interview for faculty and focus groups for students were designed, validated, and conducted. A total of 281 faculty and 908 students participated in this study. The main quantitative results indicate that students who took on-site classes evaluate the variables better than those who took hybrid classes. In addition, students who took remote classes evaluate the authenticity variable better than those who took it in alternate hybrid modality. In the case of the faculty, only the equality variable showed significant differences between the reported modalities. Besides, the main qualitative results indicate that perceptions are quite different between faculty and students while getting their perceptions from an evaluation standards scope. Thus, their perspectives around equality, authenticity, feasibility, reliability and ethics were obtained and discussed against literature. The main conclusions of the study remarked that students and faculty were positive towards most of the execution of learning assessment and learning outcomes practices during the pandemic. Nevertheless, students' preference of on-site modality was determined as the way they have more opportunities for interacting and learning more from assessment and feedback.

INTRODUCTION

The situation of educational emergency derived from the pandemic caused by COVID-19 affected thousands of educational communities and institutions around the world. Governments established different strategies to face these challenges derived from the circumstances. In most cases, the first decisions focused

on taking rapid solutions on the delivery modes based on technological tools to fulfil academic needs (Ibrahim et al., 2022; Tadesse & Muluye, 2020). These fast-track solutions permitted continuity of learning activities in most cases.

Nowadays, by the end of the health emergency situation, after several meaningful learning experiences, it is time to understand, in a deep way, the positive and negative sequels derived from almost 24 months in terms of some emergent educational practices. For this reason, this study addresses the learning assessment practices and learning outcomes achievement in general, and the performance and authentic assessment in particular for higher education. The integration of both, students and faculty perspective has been considered critical to accomplish this research objectives as assessment has been pointed out as one of the most challenging educational procedures during COVID-19 confinement (Middleton, 2020; Pokhrel & Chhetri, 2021).

Challenges Around Educational Change During the Pandemic

The time between the years 2020 and 2022 marked a drastic change in human activities worldwide. The health contingency derived from the spread of COVID-19 brought a series of new practices in the economic, governmental, industrial, health, social and educational systems mainly (Madurai Elavarasan & Pugazhendhi, 2020; Nicola et al., 2020). The common factor accompanying the measures in the aforementioned systems is the practice of physical distance to avoid contagion. Consequently, in most nations of the world, schools of different educational levels closed their doors to abide by the healthy distance measures.

This measure started between January and March 2020. In the middle of the year, in some nations, options for school reopening were granted. In fact, the United Nations Children's Fund (UNICEF, 2020) has been promoting for several months a series of considerations to the educational systems of the world for children to return to the classrooms with the necessary care: hand washing, physical distancing, use of masks and checking the temperature, among the main ones.

Thus, in several countries, these measures were adopted in different ways. Schools worldwide learned to work under special conditions and strive to deliver educational services, despite the constant occurrence of moments in which infection rates were reaching its higher levels. In Latin America, in public and private institutions at all levels, it was decided to resort to the use of television media and computer tools of different types to continue with instruction in remote modality. In fact, this is the first time in history that the remote modality has been massively used for training purposes (Wang & Sun, 2022).

The educational scenario has undoubtedly been challenging as the disease has presented variants and, therefore, difficulties to leave apart healthy distance practices. In this new reality, characterized by uncertainty, educators have had to deal with adverse situations in order to communicate with their students, transform their face-to-face classes to remote formats and motivate them to continue, despite having been directly or indirectly affected by the global emergency situation.

Learning Assessment: The Most Challenging Element of the Instructional Process

In different moments during the pandemic, it was confirmed that one of the several competencies educators need to develop is that of assessing learning with the support of digital media (Badowski et al., 2021; Chan & Luo, 2020; Yerly & Issaieva, 2021). There were identified several reasons for this statement. The first one was related to the application of quality criteria or standards while teachers try to adapt their practices from on-site modality to online or blended (Al-Sudani, 2021; Therisa Beena & Sony, 2022).

The second one referred to the use of different applications and technologies for conducting assessment in a reliable and valid way in times of paperless exams (Cáceres & Suárez, 2021; Yadav & Rana, 2021). Among the different challenges that this second issue implies, academic integrity was one of the major concerns (Judge, 2021).

The third one was related to time consuming factors while rubric design and feedback should be done in a more detailed and personalized way to correct the lack of usual faculty-students face to face interactivity (Al-Azawei et al., 2019). Other factors could be also mentioned as variables that affected the learning assessment process in the era of Covid-19, are lack of connectivity or the impossibility of counting on an upgraded personalized computer.

However, it can be inferred that this situation of rapid change may have blurred the focus of attention on this issue, which has more to do with the application of standards around assessment practices than just the use of new technologies. In fact, in our digital era of videoconferences, MLS, One note and Google Drive, students are expecting to get instructions, criterion of evaluation at high levels of interactivity while learning, as well as feedback in a fast and more efficient manners (Burrack & Thompson, 2021; Tian et al., 2021).

Assessment for Taking Decisions Based on Standards

There is vast literature about how learning assessment for planning, conducting and analyzing student results related to how their performance should be deployed (Tai et al., 2018). Undoubtedly, during the last two years, much has been said about the importance of assessment literacy and standards for guiding learning assessment decisions while the efforts for maintaining educational high quality was a priority around the world (Bijsterbosch et al., 2019; Gallardo, 2020; Pastore & Andrade, 2019). These decisions turned especially difficult during the pandemic for graduate and postgraduate competency-based education programs.

Indeed, some standards and recommendations are reported to define and carry out learning outcomes worldwide (Alonzo et al., 2019; Gallardo et al., 2015). In higher education, most of the time, faculty fully take decisions on what kind of learning outcomes should be inserted into the assessment learning systems in concordance to disciplinary and transversal competencies. It is recommended that these decisions are aligned to different aspects related to the assessment process:

(1) how to ensure that learning outcomes, learning experiences, and assessments are coherent enough to reach disciplinary graduate attributes,

(2) when and why it is convenient the use of learning taxonomies for articulating the complexity of desired learning as students' progress through a program,

(3) how to use authentic assessment progressively, to learn the performance in context as close to real-world problems as possible, and

(4) how to execute the use of standards to ensure that a personnel evaluation will be conducted legally, ethically, and with due regard for the welfare of the evaluated and those involved in the evaluation.

In fact, personnel evaluation standards are considered universally applicable (Escudero, 2013; Gullickson, 2005). In sum, these standards should permit educators take actions to:

- guide how to establish policies and procedures for statements, negotiated agreements so that evaluations are consistent, equitable, and fair.

- give access to evaluation information to the persons with established legitimate permission to review and use the information, maintaining confidentiality, privacy, and protection.

- respect human dignity and act in a professional way, taking into consideration students' self-esteem, motivation and performance.

- provide information that identifies both students' strengths and weaknesses, so that strengths can be built upon, and weaknesses addressed.

- ensure evaluations should meet the requirements of all federal, state, and local laws.

- identify potential conflicts of interests so that they do not compromise the evaluation process and results.

- establish utility of results to be informative, timely, and influential.

- choose appropriate criteria to interpret and judge students' performance, so that the basis for interpretation and judgement provide a clear and defensible rationale for results.

- execute an appropriate evaluation methodology that permits accomplish the purpose of evaluation.

- analyze contextual variables that could influence students' performance.

- examine periodically the appropriate use of standards, so that mistakes are prevented or detected and promptly corrected

Performance and Authentic Assessment for Competency-Based Learning

The pandemic not only affected the learning process that takes place in the classroom. Indeed, it also impacted the possibility to get to outdoor learning scenarios where students can transfer their knowledge and gain some professional experience. The complexity of contexts, the opportunity of participating in collaboration work and the formative essence of learning feedback are fundamental elements in the exercise of authentic assessment (Frey et al., 2012; Palm, 2008). Undoubtedly, pandemic brought hard times to display authentic assessment as part of the basic elements while learning in active learning and in competency-based environments (Halabi, 2021; Sutadji et al., 2021).

Nevertheless, ICT advances for education helped in many ways to the application of authentic assessment in these social distance times. There are several studies about the use of new generation technology for learning like immersive simulation scenarios, virtual reality, 360 video and augmented reality applications that give some support to the learning progress of students in virtual scenarios for different disciplines (Badowski et al., 2021; Lu et al., 2021) These studies' common point of view is that students get near complex real-life situations they need to understand and solve. The effect of immersion they experience while using these applications is quite good for developing high order thinking and problem-solving performance.

Therefore, authenticity in the assessment process is a variable that can be included and controlled while educational technology is moving towards the construction of real-life scenarios and situations. Nevertheless, the disadvantages related to these solutions are the high cost of introducing some of these virtual scenarios in the classroom as well as the as well as limitations due to lack of connection and appropriate equipment to support the demand for these applications.

Problem Statement

Due to COVID-19, educational institutions had to take decisions to favor the continuity of instruction. The implementation totally remote or hybrid flex modalities were the most adopted ways to give continuity to the educational process between 2020 and 2022. These decisions have modified, in certain ways, the learning assessment practices in general and the performance and authentic assessment of professional competencies in particular. Then, the research questions were

(1) what was the perception of faculty and students around learning assessment practices while working on remote or blended modalities due to global health situation?,

(2) Was the learning assessment and production of learning outcomes the same for them in comparison to on-site modality?, and

(3) how did authentic assessment processes display while working on electronic learning environments? how do they consider these experiences for their learning and development of competencies?

METHOD

Design

A mixed-method study was determined to answer the research questions (Clark et al., 2020; Onwuegbuzie & Leech, 2010). This type of method allows researchers to understand unexplored phenomena in a deeper way. In this case, the equal value and concurrent modality was applied between quantitative and qualitative data (Schoonenboom & Johnson, 2017).

Context and Participants

The population of this study included the total of faculty and students of a higher education non-profit multi campus institution located in Mexico. Different schools were involved in this study: humanity and education, social sciences, health science, business, engineering, art, and architecture and design. All the undergraduate programs have been designed from a competency-based education perspective. It is relevant to point out that a few students and faculty, specially from health science school careers, had to attend on-site lessons and professional practices during pandemic.

Table 1. Variable definition for learning assessment practices and learning outcomes

Variable	Definition
Guidelines	Clear indicators on the relationship between learning outcomes, learning experiences and learning product assessments are sustained in a coherent and cohesive relationship within subject areas.
Authenticity	Extent to which assessment tasks simulate real-world problems and situations associated with their disciplines or professions.
Advancement	Perception of levels of progression in levels of difficulty/complexity of academic products as semester unfolds.
Equality	Similarity in level of rigor & exigency around the elaboration of academic products in different modalities.
Reliability	Mechanisms & forms of evaluation allow obtaining results that represent learning achievements with fidelity.
Clarity	Criteria, indications, & procedures for elaboration of academic products are established with transparency.
Utility	The learning results are significant to continue advancing or improving towards the achievement of the expected performance.
Viability	Challenges, projects, or activities are achievable within the time and resources required.
Ethics	A series of values such as respect, confidentiality and timeliness are practiced before, during and after the development of learning products.

Table 2. Sample of participants

	Students	Faculty
Universe	6,344	484
First questionnaire delivery	5,849	477
Started the questionnaire	1,246	326
Finished the questionnaire	915	282
Data set ready for analysis	908	281
Interviews		17
Focus groups (5)	25	

Quantitative Instrument and Sample Definition Phase

A questionnaire based on personnel evaluation standards and authentic assessment practices was designed for both students and faculty (Ashour et al., 2021; Goff et al., 2015; Gullickson, 2005). In the questionnaire for students, a total of 27 statements were included. In the questionnaire for faculty a total of 39 items were designed as it was considered that some learning outcome design and feedback, as well as some authentic assessment practices needed detailed clarification for a better comprehension of faculty decisions. **Table 1** contains the variables that were considered for conforming the statements for both questionnaires.

The sample definition of students and faculty was based on these criteria: First, access was granted to the database of faculty who taught some type of training unit during the August-December 2021, with a total of 11,647 faculty. Based on this total, selection criteria such as teaching in the current educational programs, courses with more than nine hours per week, as well as belonging to certain content delivery formats: remote learning, synchronous hybrid learning, alternate hybrid learning, and on-site were determined (Johnson, 2021).

After setting the maximum possible number of faculty with these characteristics, a sample of 477 was defined. The research team emailed faculty inviting them to participate in the study. On the other hand, the strategy for the sampling of students was of the census type. A selection by convenience was determined for certain courses that were in charge of previously chosen faculty. Thus, 5,849 students were selected and invited through email. Finally, a total of 281 responses from faculty and 908 answers from students were collected using Qualtrics survey system and stored for analysis.

Qualitative Phase

A semi-structured interview for faculty as well as a focus group for students were designed to get more information about their perception of learning outcomes procedures and authentic assessment practices during pandemic. The interview counted on eight questions and the focus group counted on six questions. A total of 17 interviews to faculty and six focus groups with 25 students were held. Information details are presented in **Table 2**.

Table 3. Means and standard deviation of learning outcomes variables according to faculty and students

Variable	Mean		Standard deviation	
	Faculty	Students	Faculty	Students
Guidelines	79.60	62.32	30.70	26.55
Ethics	69.90	56.90	35.70	33.90
Viability	93.00	52.50	11.40	31.70
Utility	58.00	49.00	37.70	32.70
Clarity	93.60	73.20	9.40	20.60
Reliability	93.18	69.80	11.90	23.00
Equality	69.60	37.40	31.70	35.90
Advancement	99.56	45.40	5.96	35.90
Authenticity	88.68	66.50	17.65	22.70

Analysis

For quantitative data, a set of descriptive and inferential statistics procedures in SPSS software were used. For qualitative data, Atlas.ti software allowed an axial coding from the analysis of interview and focus groups transcripts.

RESULTS

Quantitative Results from the Students' and Faculty Questionnaire

Results of the quantitative study focused on most relevant data from agreements and disagreements of students and faculty around learning assessment practices and learning outcomes results within different modalities. In the case of students, 73% perceived the development of learning outcomes as equally challenging in the different modalities (on-site, hybrid and remote). From the 27% of students that disagreed with this statement, 53% of them thought that the remote modality was more challenging, 37% perceived on-site modality was more challenging and only 10% thought that hybrid was more challenging.

78% of the students also agreed that the criteria for the development of the learning products were equally clear in the three modalities. From the 22% in disagreement, 76% thought that there was more clarity in the on-site modality. On the other hand, 86% of faculty agreed that the criteria were equally clear across the three modalities.

Regarding the evaluation of learning products, 91% of students agreed that there was equal level of fairness in the grading and feedback process in all modalities. From the other 9%, most of them stated that there was a higher level of fairness in the on-site modality. On the other hand, 98% of faculty stated that their evaluation and feedback processes were equally fair in the three modalities. The teachers that perceived a different level of fairness in their evaluations and feedback (2%), explained that it was due to the different conditions in each modality.

In addition, 90% of students perceived equal quality in the feedback of their deliverables in the different modalities. The majority of the students who disagreed commented that feedback in the on-site modality was of higher quality. Furthermore, 98% of faculty stated that the quality of their feedback was the same in all the modalities. The teachers that perceived their feedback quality was different depending on the modality explained that in remote modality you can only give feedback based on the subject's deliverables and you do not get to know the students as well as in on-site modality, they said that some students do not turn on their cameras during synchronous sessions and they do not know if they're paying attention.

Regarding the learning outcome variables defined previously, **Table 3** shows the means and standard deviations for each variable according to students and faculty and **Table 4** the means of learning outcomes variables according to faculty and students by schools.

Table 4. Means of learning outcomes variables according to faculty and students by schools

School	G		Ethics		Viability		Utility		Clarity		R		Equality		Adv		Aut	
	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S
School of architecture, arts, & design	76	60	83	56	100	56	64	56	94	73	93	71	52	34	91	48	76	66
School of social sciences & government	90	61	88	59	100	59	76	59	94	74	97	70	64	42	94	49	68	67
School of humanities & education	72	62	92	56	100	56	75	56	93	73	94	68	64	36	96	42	68	66
School of engineering & sciences	76	63	87	58	100	58	66	58	92	73	92	70	55	36	93	45	67	66
School of medicine & health sciences	84	60	91	54	100	54	71	54	95	71	92	67	66	33	95	43	85	64
School of business	85	64	91	57	99	57	72	57	94	74	95	70	60	42	93	47	71	67

Note. G: Guidelines; R: Reliability; Adv: Advancement; & Aut: Authentication

Table 5. Significant differences of variables among modalities

Variable	(I) Delivery mode	(J) Delivery mode	AD (I-J) students	Sig.	AD (I-J) faculty*	Sig.
Guidelines	On-site	Synchronous hybrid learning	10.365*	.020		
Ethics	On-site	Synchronous hybrid learning	12.943*	.023		
Viability	On-site	Synchronous hybrid learning	12.662*	.017		
		Alternate hybrid learning	12.201*	.037		
Utility	On-site	Synchronous hybrid learning	11.545*	.037		
Utility	On-site	Alternate hybrid learning	7.698*	.043		
Utility	On-site	Alternate hybrid learning	10.112*	.017		
Equality	On-site	Remote learning	12.513*	.025	-21.367*	.011
		Synchronous hybrid learning	15.337*	.011		
		Alternate hybrid learning	15.399*	.020		
Advancement	On-site	Alternate hybrid learning	13.821*	.036		
Authenticity	On-site	Alternate hybrid learning	9.540*	.021		
	Distance learning	Alternate hybrid learning	7.749*	.022		

Note. AD: Average difference

Regarding students, significant differences were found in all learning outcomes variables by modality when controlling for campus. In general, students who took on-site classes evaluate the variables better than those who took hybrid classes. In addition, students who took remote classes evaluate the authenticity variable better than those who took it in alternate hybrid modality. In the case of the faculty, only the equality variable showed significant differences between the reported modalities. The professors who taught on-site seem to think that there is less similarity in the quality of the different modalities, contrary to what happened with the students. Furthermore, there was a significant difference found in the clarity variable depending on the number of synchronous sessions scheduled, teachers who had synchronous classes only once a week evaluated the clarity variable a little lower that the teachers with more synchronous classes scheduled. In **Table 5** a summary the significant difference by modality is shown.

Qualitative Results from the Students' and Faculty Focus Groups and Interviews

Results of the qualitative study focus on most relevant information about perceptions on experiences during pandemic for the learning outcome process of design, implementation and assessment. In this section both, students' focus group and faculty interviews results are reported.

Results from interviews and focus groups

Throughout the interviews with faculty a total of 17 codes were registered. Then, five main analysis networks were recognized into the most relevant topics around learning assessment challenges:

(1) connections among curriculum, competencies, and modalities,

(2) authentic assessment during pandemic,

(3) performance assessment feasibility,

(4) learning assessment ethical practices, and

(5) learning outcomes assessment criteria and feedback.

Students focus groups were taken as a support element to compliment and contrast faculty perceptions.
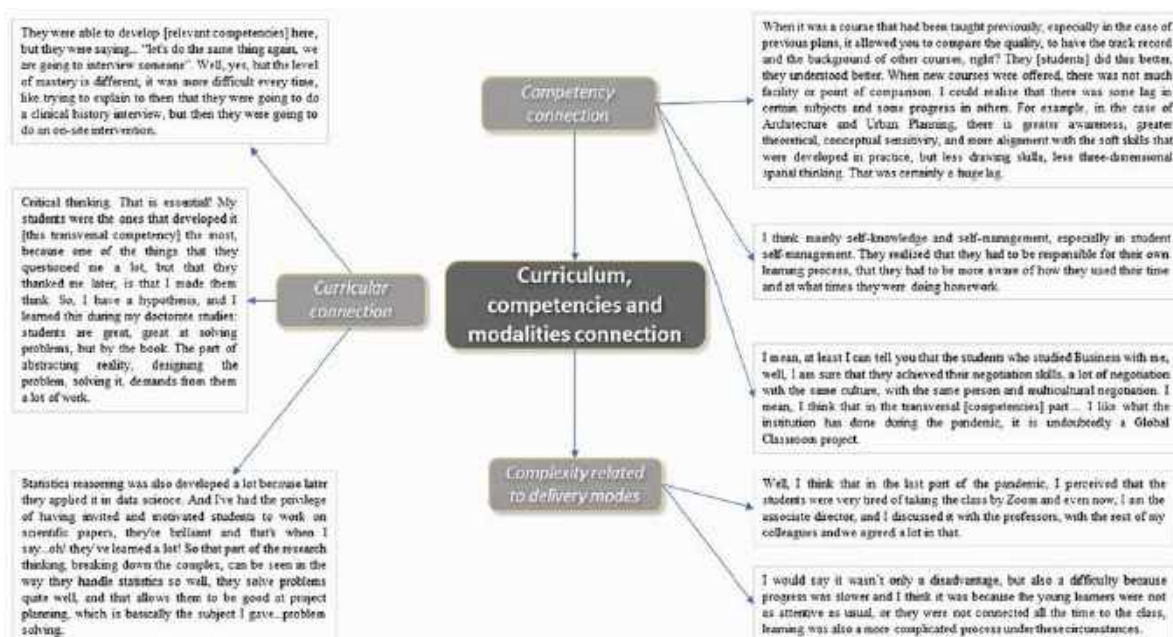
Figure 1. Curriculum, competencies, and modalities connection (Source: Authors' own elaboration)

Connections among curriculum, competencies and modalities

This network emerges from the assembling of three codes and its quotes: modality complexity, curricular connection and competencies connection. There are some particular aspects that emerge around modality complexity from faculty interviews as it was perceived that their work and time while preparing and implementing lessons was duplicated. This extra effort was due mainly to the need of ensuring that students were given the necessary content as well as having the opportunity of developing the expected performance levels according to disciplinary and transversal competencies in virtual learning environments. Besides, there were complementary aspects that should be considered as the didactic resources, learning strategies and type of modality. Then, one of the most challenging decisions was conducting students to develop their capabilities of autonomy and management of their learning process, besides their fatigue of having to attend long hours classes on remote learning experiences modality (**Figure 1**).

> Faculty–competencies connection–quote 1: Critical thinking [as transversal competence], that's essential! That was the one they developed the most [during pandemic], because I think that one of the things that they questioned me a lot, but that they appreciated afterwards, is that I made them think. So, I had a hypothesis … students are great, great at solving problems, but [guided just] by the book. The part of abstracting reality, designing the problem, solving it, cost them a lot of work.

> Faculty–curricular connection–quote 2: Systemic thinking. I put them in a lot [of exercises]. In all subjects [during pandemic]. Also, the development of statistics … they developed a lot because then they applied it in data science. And I've had the privilege of having invited and pulled kids to work on papers, they are brilliant and that's when I say … oh! If I've taught them, they've learned if they've developed well.

On the other hand, through the focus group it was possible to understand in a more detailed way the differences students recognized on learning assessment in different modalities. On the remote modality, they expressed that the academic load was higher. For instance, they mentioned that the level of complexity for stablishing interaction with other students was high. The first challenge was learning to work with pairs efficiently even if they had never met before. Then, as the virtual session was over, they had no other way to interact with them to finish the project of homework they were assigned. They mentioned that it was easier

to get the work done when they had the possibility to meet each other on-site modality, in class or in some extra time in the library or in a meeting room after class.

Regarding the hybrid modality specifically, some students mentioned it was more frustrating than the remote one, because students who were taking the class online could not always hear what their classmates were saying, or they could not always see clearly what the professor was writing on the board. Consequently, students who were taking the class online felt they were in disadvantage as it was not possible to capture the same information as students who were on site. They also mentioned problems when trying to share the presentation at the same time in the classroom and in videoconference, as there were some technical problems in the classroom equipment.

About the competency connection, students expressed that they felt they developed higher sense of self-knowledge while working in the remote modality. They also perceive that their competencies on communication and socio-emotional skills got better.

> Students–modality complexity–quote 1. In terms of assignments and activities, I think the workload is less in the face to face modality [in comparison to remote modality] because many of the activities are done in class. You can take more advantage of the time, unlike online or hybrid, because professors put you in the break-room and you end up talking, and after you have wasted some time talking with pairs you have to deliver the activity; and there is also often confusion from the professors with the activities, that if they already assigned one, or that this task enables the next delivery, and so on. So, I would say that this aspect had several difficulties.

> Students–modality complexity–quote 2. In the hybrid model, I felt that it was a little more frustrating than the remote one, because for example, if the professor was teaching from the classroom and there were students there [on-site] in that classroom, there were times that what my classmates were saying could not be heard well … or the teacher's microphone was sometimes disconnected …, and there were times when we could not share the presentation at the same time in the classroom and in Zoom. That is why I felt kind of frustrating, because it was like, some were there in the classroom and they were understanding, but those of us who were in Zoom were not understanding very well and capturing the same thing.

Elements of assessment authenticity during pandemic

This network emerged from the assembling of three codes: authenticity, instructional design and connection with competencies. Indeed, getting to plan learning activities looking for reaching competency level as well as instructions for learning outcome production in remote environments were the most challenging tasks for faculty. Authenticity could be managed in various ways: inviting experts or business owners to video conference meetings with students in real time or through recorded material, analyzing real and complex cases they needed to give solutions, doing documentary research with meaningful and recent resources and, in some cases, using immersive materials like virtual reality and 360° videos.
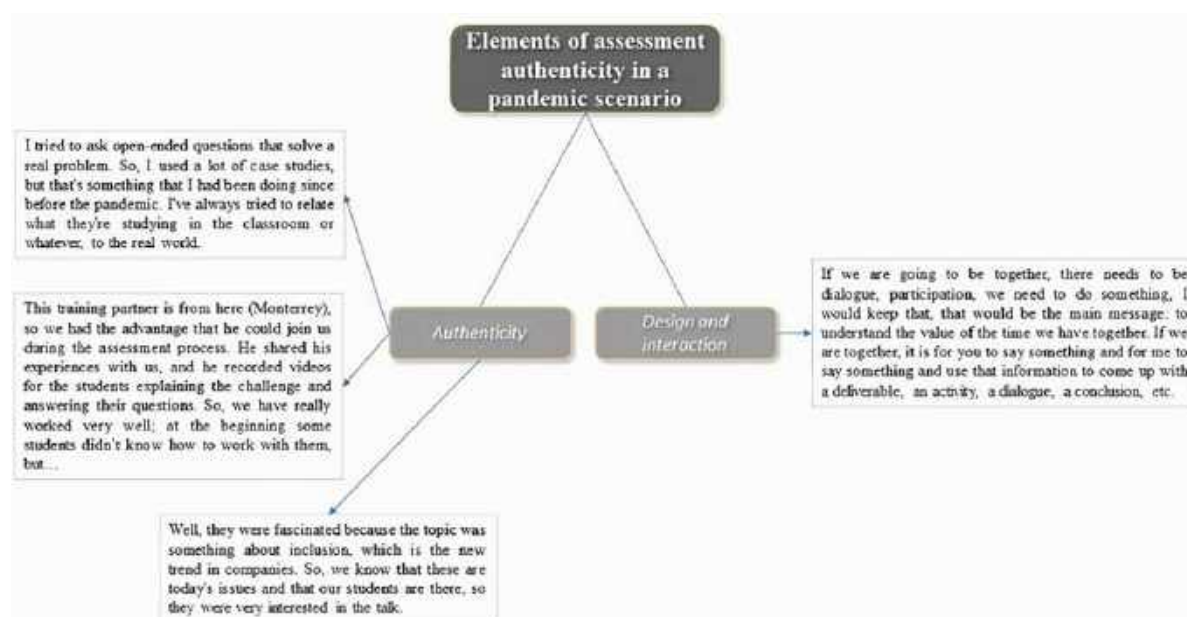
Figure 2. Elements of assessment authenticity during pandemic (Source: Authors' own elaboration)

There was also special emphasis in the communication frequency and quality as a crucial element for working on authenticity. As some faculty said, interaction with students and among them became highly important to promote critical thinking and problem solving as ways to orient students' thinking and reach the expected performance level. The problem for getting and feeling closer to one another, is that there were some students who took the decision of not using their cameras during real time sessions and, in some cases, the lack of response of students while their participation was asked (**Figure 2**).

> Faculty–authenticity–quote 1. We went so far as to invite a colleague from … in Italy. In other words, she connected from Italy and gave us a talk. And also, in hybrid modalities, these different guests who connected to talk to us and that was already a part of our culture.

> Faculty–connection with competencies–quote 2. Well, the positive thing [in the communication with students] is that online communication was direct, they could be with us all the time and we could give feedback and interact constantly. So, despite the distance, communication flowed, enabling all the means and support for their learning.

Students had different perspectives from faculty regarding authenticity during the pandemic. On one hand, some of them argue that there was lack of authenticity in remote modalities because the offer of training partners got limited, and they could not visit the enterprises or communities they were working with. Besides, sometimes obtaining the information of certain communities or groups just from the Internet was practically impossible. In consequence, they could not understand the complexity of the problems they were working on. Other students expressed that in careers like Architecture and Design they needed to be in contact with materials. Unfortunately, the pandemic circumstances did no permit such an experience. Some others mention the difficulties for working on labs. Even if a few professors look for virtual labs or simulators, others just made them watch videos or focused on the theoretical aspects. This situation also affected their learning motivation.

On the other hand, some students mentioned that the remote modalities enhanced authenticity. For instance, they could work with training partners from diverse Mexican regions. One of the students mentioned that he adapted his project to focus on the COVID situation, so this made him feel he was really contributing to a real situation not just a hypothetic one.

> Students–authenticity–quote 1. One of the things that I also appreciate, in my case, in my career, is the work with the training partners; in the different challenges we had different training partners,
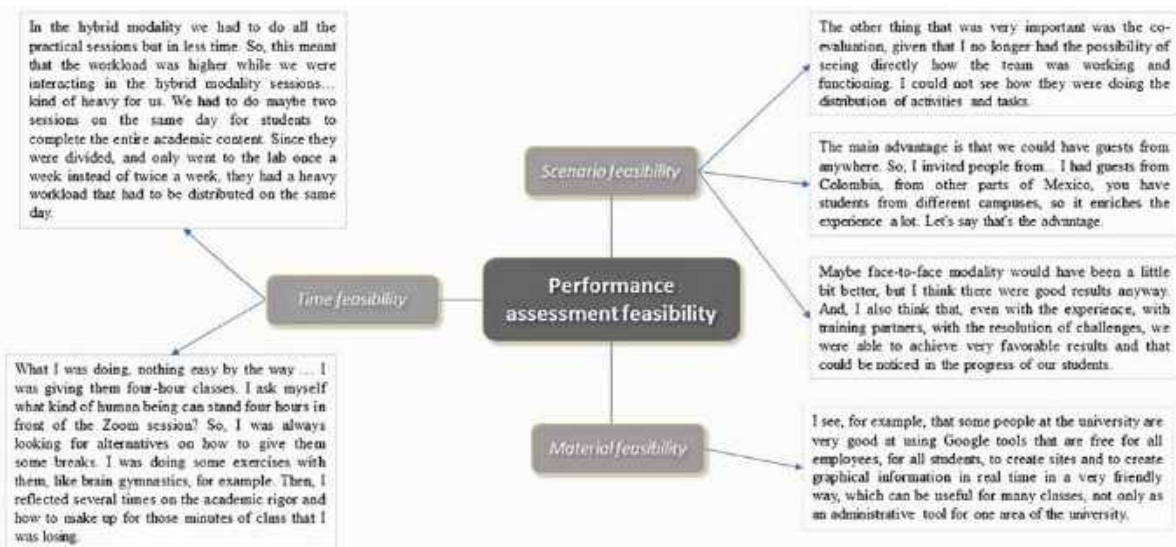
Figure 3. Performance assessment feasibility (Source: Authors' own elaboration)

not only from Puebla, but also from other states that were given the facility to connect to the Zoom sessions, as opposed to going to visit us in the classroom on the campus.

Students–authenticity–quote 2. Talking about experience, perhaps, I feel that it lacked a lot because, as my pairs say, suddenly we could not go to the places we had to go to do the project well, to better understand the problems; and as I studied architecture and design, they also ask us for materials and we like to go to see the materials, to touch them, to feel them, and we could not do that because of the pandemic.

Performance assessment feasibility

This network emerged from the assembling of three codes: scenarios, time management and access to materials and resources. Even if this network is tightly connected with authenticity elements, there are some differences that make it not only authentic but feasible to work on competency reaching goals. Faculty agreed that getting to work on real scenarios was due to the accessibility of most training patterns (enterprises, business, hospitals) that made it possible for students to reach real locations and make some on-site practices respecting all the suggestions for preventing contagion.

Besides, some strategies made it possible to invest more time on quality and valuable learning activities rather than evaluating a great amount of learning products. One of these strategies was inserting co-evaluation processes for qualifying certain learning outcomes, so students helped faculty to visualize and act on strengths and weaknesses of other learners. The other strategy was doubling lab time to one day a week instead of two, so students could get their practice in a more secure environment decreasing the level of risk of contagion due to mobility to places outside their homes (**Figure 3**).

Faculty–scenario–quote 1. We even had training partners. The block [lesson] in which I participated had training partners. We met every week with them, not face-to-face, but online. About the human sense, well, I think it was diminished because we could not contact the communities, so there was a change in terms of openness, socialization of the results, of the challenges … because we could not have access to the community to be able to show the results, but nothing else [no problem].

Faculty–scenario–quote 2. That training partner is from here in Monterrey, so we have the advantage that he could join us for the evaluation. He shared his experiences with us, and he recorded videos for the challenge students, and answered their questions. So, we worked really well with that one and the students at the beginning were surprised with their eyes wide open as we are going to work with them, "but I am only in my 4th semester, I am a student" one of my students said.

Students also had different opinions about the feasibility of assessment and feedback in virtual modalities depending on the subject and the teacher. On one hand, students stated that it was very difficult to communicate with some of the professors in the online environment because they did not answer their messages in a timely manner. Then, they felt that there was a better quality of interaction on-site modality. Besides, students argued that some projects could not be evaluated in a virtual environment, for example the architectural models needed to be seen on site. In consequence, the quality of feedback was different as the professor could only see the products through the web camera. They also mentioned that some projects were very difficult to accomplish because they could not easily find all the materials and they did not have access to the laboratories. They felt these disadvantages as unexpected challenges they needed to solve as some final projects required them to use special materials and equipment.

On the other hand, they expressed that the process of learning to use specialized software was more feasible to do it online. Since these tools are digital programs, they could clearly observe and followed all the steps on their teacher's screen. Also, when you were online they could easily take screenshots to store information backups of what they were learning. This practice was not possible in on-site modality.

> Student–access to materials and resources–quote 1. I think that the projects were also more demanding, they asked: "well, you have to build the prototype", but how are you going to do it? who knows! I mean, you are going to have to get recycled material from your house to see if you can find a straw to replace a stick. So, I think that sometimes there was no flexibility with the professors, and it was like: "let me go to my classmate's house to see if he has straws, and to the other classmate's house to see if he had something else". So then, yes, we needed a little more flexibility and giving us access to the labs. I think it was very challenging to work like that.

> Student–access to materials and resources–quote 2. Adobe, Photoshop, Illustrator, since they are digital programs [it was easy to learn] by sharing the screen. You could clearly see where they cut or what elements to add, because months ago the professors tried to teach us to use them in the classroom using the projector, but the projection was not good. So, it was like: "what did they cut? or where was it?" so, online you could take a screenshot and then you had that backup, but since I in the classroom it is somewhat more complex.

Learning assessment reliability and ethics

This network emerged from the assembling of three codes: reliability based on performance assessment, reliability on honesty from students and ethical practices from faculty while executing learning outcomes qualification and feedback. In this network planning and implementation actions of assessment decisions related to learning outcomes matters are included.

At the assessment planning stage, faculty identified some advantages and disadvantages from using ICT tools for designing exams, as the collaboration for this kind of tasks is possible with new computing tools that permit multiple sharing options among colleagues. The possibility of inserting video materials and outsourcing texts ease work on authenticity matters as it is possible to bring real life situations to exams as well as variety in questions design.
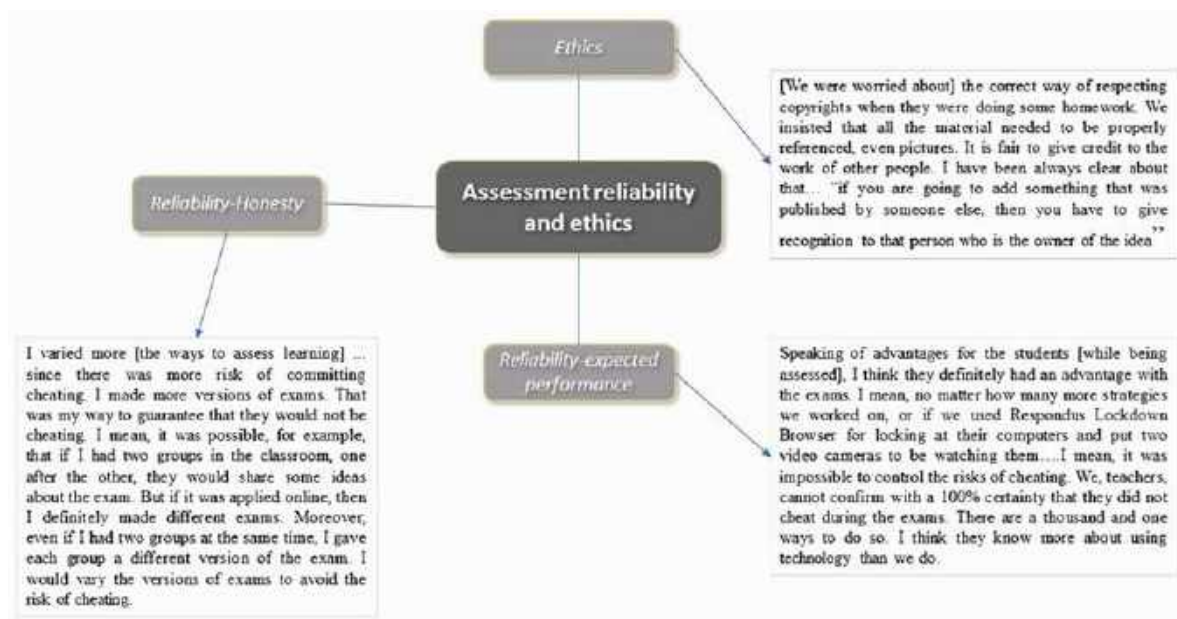
Figure 4. Learning assessment reliability and ethics (Source: Authors' own elaboration)

At the implementation stage, faculty expressed that there is always fear about plagiarism acts, even though there are electronic authenticity verification tools available on the learning management systems. Nevertheless, lack of students' ethical decisions such as taking others' homework or making a few copies of texts and quotes without giving full credit to original authors are behaviors that faculty identified as quite common actions that devalue assessment practices (**Figure 4**).

> Faculty–reliability based on performance assessment–quote 1. I varied more, since there was the possibility that they would copy, I made more versions of exams to guarantee that they would not be copied. That is, it was possible, for example, that if I had two groups face-to-face, one after the other, then I would give them the same exam. But if it was online, I definitely did different exams. Moreover, even if I had two groups at the same time, I would give each group a different version. That is to say, I varied the versions to minimize copying.

> Faculty–ethical practices–quote 2. As I was telling you about the exams, the young learners no longer distinguish what is ethical and what is not ethical. So, it went down terribly [honesty value].

On the other hand, students expressed their concerns about the reliability of learning assessment in remote environments. One of their main concerns was the time given solved the problems and questions. They mentioned that online exams had too many questions to be solved in a short period of time. They mention that they felt more relaxed and concentrated in on-site exams.

Another problem with online exams was the scheduled deadline. Students argued that some teachers got confused and schedule it at 12 pm instead of 11:59 pm, which means they only had until midday to do so. This confusion had consequences for them as they had to attend other classes at the same time.

About ethical practices during evaluation, students only mentioned that any type of fraud in the delivery of assignments or in an exam was completely a personal decision.

> Students–reliability of learning assessment in remote environments–quote 1. I am a person who likes to take the exams with time, that is, I do not like to be pressured, to be told: "you have one hour", so, in the online mode my teachers told me: "you have one hour to take the exam". So, the truth was that it was too long to do it in one hour and then I had to scan it, upload it, so I wasted a lot of time and got very stressed; and now that we are back to the on-site mode and we are doing the exams on-site, the truth is that I feel very relaxed, I concentrate much more and I have done much better, to tell the truth.
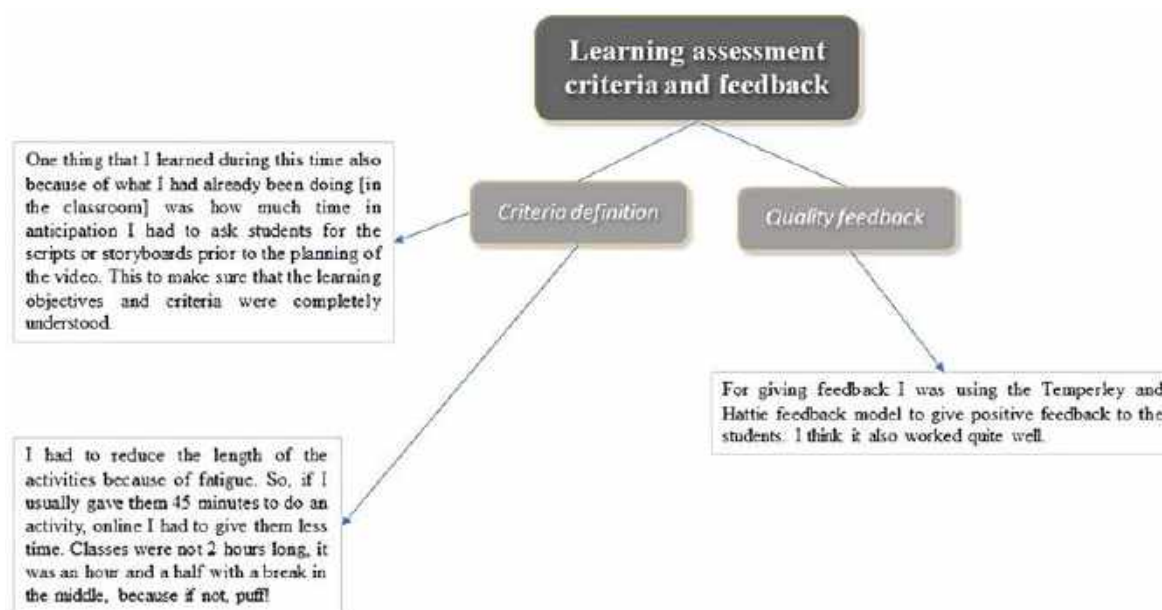
Figure 5. Assessment criteria and feedback (Source: Authors' own elaboration)

Assessment criteria and feedback

This network emerged from the assembling of four codes: criteria definition, criteria communication, feedback quality process, and feedback from results. In fact, one of the most challenging tasks that emerged from the analysis is related to the adaptation process faculty needed to flexible academic rigor without depreciating the positive aspects of learning outcomes. These decisions needed to be aligned with academic quality and, at the same time, consider students' motivation level to keep on working in remote or hybrid environments. For this reason, some faculty revised carefully the criteria lists in advance to adapt homework assignments to new reality and then modified learning assessment strategies and outcomes.

Besides, the way to give feedback to students was another challenging matter. A few professors reported giving feedback based on recommended models in order to focus on the most important aspects to communicate strengths and weaknesses that could be inferred through learning outcomes. Another strategy that was reported was partial progress reviews as a way to orient students' performance in a more guided way (**Figure 5**).

> Faculty–criteria communication–quote 1. One thing that I learned during this time also because of what I had already been doing [in the classroom] was how much time in anticipation I had to ask students for the scripts or storyboards prior to the planning of the video. This to make sure that the learning objectives and criteria were completely understood.

About the assessment criteria, some students feel that it is very similar in remote, hybrid and face-to-face modalities. Others thought that professors were a little less demanding in remote modalities. However, in general students' opinion in that they received better feedback in a face-to-face modality. They argued that in the classroom they could ask more questions and receive better feedback in the right moment.

> Students–criteria communication–quote 1. As for the assignments and projects, the truth is that my professors are still as demanding, both in virtual and face-to-face mode.

> Students–feedback quality process–quote 2**.** The same now that we are back in the classroom [in some courses], it's like in this modality we can ask more questions and get more feedback, so I really like the face-to-face modality better.

DISCUSSION

In terms of the results four main findings of the perceptions of faculty and students about the assessment practices based on standards in different modalities are discussed. The first one refers to the level of assessment equality. In this study, a significant difference between faculty and students were found in terms of equality related to assessment practices in different modalities. In fact, students reported lower agreement levels according to their equity assessment experiences comparing on-site modality in contrast to remote learning. It could be inferred that these findings present some contrary results in terms of students' perception while in a similar study Yen et al. (2018) reported equal satisfaction in three different modalities while working on their learning outcomes. Nevertheless, it is important to consider that these differences could be different in terms of time and context of pandemic in which students did not have a wide range of alternatives for continuing their academic activities.

The second discussion point is related to how authentic assessment strategies and activities were displayed while working on virtual learning environments with programs designed from the competency-based education perspective during pandemic. Additionally to the findings reported in a study conducted in Indonesia (Sutadji et al., 2021) related to the use of case study questions, online discussions with peers, writing papers, conducting reviews and criticisms, in this study there were detected other types of authentic assessment activities during confinement, such as inviting experts to the videoconference meeting and recording videos of real scenarios for explaining in detail the complexity of challenging situations students needed to work on.

The third one refers to the level of authentic assessment feasibility during pandemic. In this study, and in addition to some assessment practice changes to get learning outcomes adapted and renewed (Hikmah et al., 2021; Yerly & Issaieva, 2021) it was found that some students resented the impossibilities for getting to work with materials and physical scenarios that were not available. This was specifically sustained by students who need to develop most of their professional competencies by getting experiences in real scenarios like architects, designers, medical students, etc. while trying to minimize the ravages of educational backwardness (Vanka et al., 2020).

The fourth part of this discussion is related to the perception of faculty and students or learning outcomes definition, feedback, and some ethical behaviors. At this point, it was found that there are some similarities with other studies while students and faculty indicated that feedback as well as the possibility of interaction with pairs and professors around assessment results were fundamental for keep on learning in spite of the circumstances (Senel & Senel, 2021). In the ethical aspect, in the literature there are some coincidences as cheating has been recognized as one of the most common bad practice during pandemic (Balderas & Caballero-Hernández, 2020). For this reason, not only more versions of exams are required but also the design of higher mental process questions as well as changing the frequency of application (Nguyen et al., 2020). In this study, faculty also expressed the need around being conscious of the number of opportunities students could have while being assessed through electronic systems in comparison to the control that could be ran in a face-to-face scenario.

CONCLUSIONS

This study permitted to count on a more profound understanding of the perceptions of faculty and students around learning assessment practices during pandemic. It could be confirmed that the perception of students and faculty about most of the assessment practices and learning outcomes design and feedback were positive in the different modalities. Nevertheless, it can also be inferred that faculty in charge of remote classes perceived more similarity in the rigor and requirement in the learning assessment process in the different modalities than their pairs who participated in on-site classes. Besides, it seems that the students who took remote classes perceived less similarity in the rigor and requirement in the evaluation of the different modalities than those who took on-site classes.

The second conclusion is related to the way of analyzing learning assessment practices and learning outcomes process and results from the standards scope. Indeed, the way students and faculty perceive ethics, viability, utility, clarity, reliability, equality, advancement and authenticity among the educational experience

in different modalities is a research field that should be studied in a deeper way and in other scenarios. Even if there was only one coincidence in significant difference between students and faculty in the equality variable, it is relevant to highlight the way students evaluated each of the other variables. Undoubtedly, the scores given by students were less optimistic than the ones given by faculty. It is recommended to deepen in the research of these perceptions in following studies.

The third conclusion is about the possibilities of including authentic performance assessment elements in online or hybrid learning environments. Even if solutions arose from the creativity of faculty in order to get in contact with reality and complex situations students could analyze and work on for proposing solutions, students of some disciplines did not agree with the replacement of materials, situations or scenarios to be conducted in a remote or hybrid modalities. Again, it is advisable to continue exploring alternatives for conducting authentic assessment to counteract the effects of distance or the impossibility of accessing to face-to-face environments.

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