



Determinants of Students' Perceptions and Satisfaction with Virtual Learning Environments: Evidence from a Peruvian Public University

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Abstract

This study analyzes students' perceptions of virtual learning environments used in academic training at the Faculty of Social Sciences during 2023. A quantitative, cross-sectional design was employed, using a structured survey administered to students from the professional programs of Anthropology, Sociology, Tourism, Social Communication, and Art. The instrument assessed key dimensions such as accessibility, interactivity, content quality, perceived effectiveness, proposed improvements, and overall satisfaction with virtual learning platforms. The results indicate heterogeneous perceptions across programs; however, flexibility, convenience, and ease of access to academic resources were consistently identified as the main advantages of virtual learning. Videoconferencing platforms with high levels of interoperability were reported as the most frequently used and preferred tools for instructional delivery. Overall, students reported predominantly positive experiences and a generally satisfactory level of acceptance of virtual learning environments. These findings provide relevant empirical evidence to inform the optimization of virtual educational platforms and support the adaptation of teaching strategies to better align with students' academic needs and expectations.

Keywords: Behaviors, students, digital environments, perception, technology, online education, e-learning.

Introduction

Education is currently in constant transformation due to the impact of emerging technologies Incacutipa-Limachi et al. (2024). The use of digital media in educational environments has acquired significant relevance, posing challenges and opportunities for students, teachers and educational managers. In this context, this study focuses on exploring the perception of the use of educational digital media by students.

The Faculty of Social Sciences, as an integral part of UNA Puno, plays a fundamental role in the training of professionals in various disciplines such as: Art, Sociology, Anthropology, Communication Sciences, Tourism and a department of humanities. In the current context, access to digital technologies has transformed the dynamics of learning, presenting new opportunities and challenges in the educational process. This study seeks to analyze students' perception of the effectiveness, usefulness, and challenges associated with the use of digital media in their academic experiences, as mentioned by (Chalela et al., 2016) Those who believe that virtual platforms allow students to feel more efficient in their learning process, there are still great challenges for the implementation of new technologies as mediation strategies for the teaching-learning process.

Through the research, it is intended to obtain a deep understanding of how students perceive the integration of digital media in their learning process, examining factors that can influence their acceptance and adaptation to these technological tools. La Torre Castillo (2020). They consider that the majority of students are in favor of the use of virtual classrooms and previous experience favors a better perception of the tools for online learning. In addition, possible recommendations will be explored to improve the implementation of digital media with the aim of enhancing the educational quality and satisfaction of students in this institution Mamani-Flores et al. (2025). Ultimately, this study will contribute to the growing body of knowledge on the intersection between university education, digital technologies, and student experiences in a specific context (Quispe-Mamani et al., 2022).

The increasing adoption of virtual learning environments in higher education, such as at the National University of the Altiplano (UNA Puno), has transformed learning dynamics by enhancing flexibility and access to digital resources; however, students' perceptions of the effectiveness and quality of these environments remain a critical issue. Four years after their implementation, it is necessary to examine how students of the Faculty of Social Sciences perceive and evaluate these virtual environments in order to identify strengths, challenges, and areas for improvement in pedagogical strategies. Accordingly, this study investigates students' perceptions in 2023, focusing on motivational factors, the use of digital tools, and learning outcomes, with the aim of contributing to the improvement of the quality and effectiveness of virtual education.

Theoretical framework

The analysis of students' perceptions and satisfaction with virtual learning environments is grounded in a multidimensional theoretical approach that integrates contributions from cognitive psychology, technology adoption theories, and constructivist pedagogical models. From a cognitive psychology perspective, perception is understood as an active process of selection, organization, and interpretation of information from the environment (Vargas, 1994, p. 48), influenced by individual factors such as prior experience, expectations, motivations, and attitudes Robbins et al. (2009). In virtual educational contexts, these factors shape how students interpret the usefulness, ease of use, and effectiveness of digital platforms.

From the perspective of technology adoption, the Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are key determinants of individuals' acceptance and use of technological systems in educational settings. These assumptions are complemented by broader frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT), which incorporates variables such as social influence and facilitating conditions—particularly relevant in university contexts characterized by connectivity and infrastructure limitations, as is the case in Andean regions. Accordingly, students' perceptions depend not only on technological availability but also on institutional support and faculty training for the pedagogical use of virtual environments.

Additionally, this theoretical framework draws on the constructivist approach to learning, which views students as active agents in the construction of knowledge through interaction with content, instructors, and peers. Virtual learning environments that incorporate active instructional strategies, collaborative tools, and effective feedback mechanisms can promote meaningful learning experiences and enhance student satisfaction. Concepts such as social presence, pedagogical interaction, and platform usability are therefore essential for explaining levels of acceptance and satisfaction reported by students.

Finally, the integration of formal platforms (such as Moodle or Laurassia) and informal communication tools (such as WhatsApp) can be interpreted through an ecological perspective of digital learning, in which multiple technological environments and resources coexist and complement one another. This perspective helps explain why students tend to positively value platforms that facilitate immediacy, flexibility, and academic support—key elements of the virtual educational experience.

But Allport (1974), thinks that perceptions come to be the understanding of the perceptions of the complex circumstances in the social, cultural and environmental environment of each object around us. This is an inclination to consider cognitions as perceptions, and we must understand that both processes are intimately related

because it is not feasible to consider them separately, especially from the theoretical and practical approach.

Perception is structured by a series of phases. Thus, we take into account García (1999), which explains it as follows: The perceptual process is structured into three complementary phases. First, early perception, in which the perceptual system encodes the basic sensory properties of stimuli—such as color, shape, movement, depth, and spatial location—allowing the identification of the object's initial structure. Second, perceptual organization, which integrates and preserves the acquired information by establishing coherent relationships among different elements, thereby forming a unified representation of the environment. Finally, the recognition phase involves assigning meaning, function, and identity to objects through the comparison of current perceptual information with knowledge stored in long-term memory, a process that may occur either consciously or unconsciously.

Rivas (2008) He conceptualizes perception as a process that has three phases specifically: the first selection, the second is the organization and finally the interpretation phase. The first phase begins when we begin to perceive aspects related to our interest, in this select perception: the subject discovers messages with codes related to his or her own activities, interests, values and needs. The next phase is the organizational, where once selected, individuals classify generating and giving meanings, then analyze and group them through their characteristics. In the third phase, the individual tries to give content through the stimuli that were previously chosen and structured; Thus, the interpretation of these stimuli varies, according to experience, expectation, and interest.

It theorizes about the factors that affect the perceptions that reside in the perceivers, since, when an individual observes an object, he tries to generate an interpretation, being already influenced by its peculiarities in a personal way (Lecarnaqué Rojas et al., 2024). Among the elements that influence perceptions are attitude, motivations, regressive experiential practices and finally expectations (Barra-Quispe et al., 2024).

Methodology

The study was conducted at the National University of the Altiplano (UNA-Puno), specifically within the Faculty of Social Sciences, which comprises five professional schools and the Academic Department of Humanities. Data were collected during the 2023 academic year (semesters 2023-I and 2023-II) from a population of 508 undergraduate students enrolled between the fourth and eighth semesters, all of whom had prior experience using the university's virtual learning environments (Table 1).

Table 4 Distribution of the population by professional school of the Faculty of Social Sciences

Faculty	Career School	Number of students
Social sciences	Anthropology	108
	Art	93
	Sociology	110
	Tourism	92
	Social Communication Sciences	105
Total		508

Sample

The study employed a stratified random sampling design to ensure representative participation across the target population. Participants were selected randomly within each stratum. Sample size was calculated using a standard formula based on population size (N), margin of error (e), and z-score (z). The final sample consisted of 112 students, as detailed in Table 2.

Table 5 Sample Details

Gender	Quantity	Age Groups	Quantity	Semesters	Quantity
Male	45	[17-22>	93	III	39
Female	67	[22-26>	10	IV	68
		[26-30>	6	V	4
		[34-38>	1	VIII	1
		[38-42>	1		
		[46-50>	1		
Total	112		112		112

The study employed a quantitative, non-experimental, cross-sectional, and exploratory design to analyze students' perceptions of virtual learning media through a survey administered to students from the five professional schools of the Faculty of Social Sciences. In line with quantitative research principles, the study involved no deliberate manipulation of variables and examined phenomena in their natural context Hernández et al. (2014). The sample size was calculated with a 95%

confidence level and a 5% margin of error, including students from the fourth to the eighth academic semesters.

To ensure methodological rigor, the study employed a validated and reliable survey instrument developed from prior research and assessed through expert judgment, with acceptable internal consistency. Stratified random sampling improved sample representativeness and reduced selection bias. Given the cross-sectional, non-experimental design, findings are interpreted cautiously, focusing on associations rather than causality, while acknowledging self-report bias and mitigating it through anonymous data collection.

Ethical considerations were addressed in accordance with internationally accepted research standards. Participation in the study was entirely voluntary, and students were informed about the objectives of the research, the confidentiality of their responses, and their right to withdraw at any stage without academic consequences. Informed consent was obtained prior to data collection, and no personal identifiers were recorded, ensuring anonymity and data protection. The study respected the principles of autonomy, beneficence, and non-maleficence, and the collected data were used exclusively for academic and research purposes. These methodological and ethical safeguards contribute to the credibility, transparency, and trustworthiness of the findings.

Results and discussion

Students' perception of virtual environments in their learning process

To determine the perception of students of the Faculty of Social Sciences of the National University of the Altiplano – Puno about the knowledge of the virtual environments used in the teaching-learning process, we have grouped this perception into three (3) types of platforms whose use offers different elements, such as interoperability, flexibility and ease of use. In this way we can classify: unique integrated systems (Laurassia, Moodle, etc.), interoperability platforms for videoconferencing (CiscoWebex, Zoom, Google meet, Microsoft Team, etc.), and instant messaging tools (WhatsApp, Telegram, etc.) and educational tools included within interoperability platforms (classroom, JamTable, Google documents, etc.). according to Humanante et al. (2019), when there is a positive perception, proposals can be generated aimed at improving virtual environments in an institution.

Table 3 indicates a moderately positive perception of the Laurassia and Moodle platforms, with positive evaluations exceeding 15% and negative perceptions remaining below 10%; however, a high proportion of students reported regular or neutral perceptions, suggesting limitations in access, use, and pedagogical integration of these platforms, potentially associated with technological constraints, insufficient digital training, and connectivity challenges in the regional context Mamani-Flores et al. (2025). Higher participation was observed among female students and those in the fourth and fifth semesters, while age showed no significant variation. These findings

are consistent with previous evidence indicating that, despite their contribution to academic performance, virtual learning platforms may be associated with limited student motivation and engagement when not adequately integrated into instructional practices Ramos (2014).

Table 6 Perception of the unique integrated systems (Laurassia and Moodle) used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
What is your perception of the Laurassia virtual environment?																
Excellent	2	1.8	3	2.7	5	4.5	0	0.0	5	4.5	0	0.0	0	0.0	5	4.5
Good	4	3.6	4	3.6	8	7.1	2	1.8	3	2.7	2	1.8	1	0.9	8	7.1
Regular	12	10.7	26	23.2	38	33.9	14	12.5	23	20.5	1	0.9	0	0.0	38	33.9
Suitcase	4	3.6	5	4.5	9	8.0	4	3.6	5	4.5	0	0.0	0	0.0	9	8.0
Very bad	2	1.8	1	0.9	3	2.7	2	1.8	1	0.9	0	0.0	0	0.0	3	2.7
No know/No opinion	21	18.8	28	25.0	49	43.8	17	15.2	31	27.7	1	0.9	0	0.0	49	43.8
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	112	100.0
What is your perception of the Moodle virtual environment?																
Excellent	3	2.7	1	0.9	4	3.6	1	0.9	3	2.7	0	0.0	0	0.0	4	3.6
Good	4	3.6	12	10.7	16	14.3	4	3.6	9	8.0	2	1.8	1	0.9	16	14.3
Regular	13	11.6	20	17.9	33	29.5	11	9.8	22	19.6	0	0.0	0	0.0	33	29.5
Suitcase	4	3.6	4	3.6	8	7.1	3	2.7	5	4.5	0	0.0	0	0.0	8	7.1
Very bad	1	0.9	1	0.9	2	1.8	2	1.8	0	0.0	0	0.0	0	0.0	2	1.8

No know/No opinion	20	17.9	2.9	25.9	49	43.8	1.8	16.1	29	25.9	2	1.8	0	0.0	49	43.8
Total	45	40.2	6.7	59.8	112	100.0	3.9	34.8	68	60.7	4	3.6	1	0.9	112	100.0

Note. The table presents data on participants' perceptions in six categories (Excellent, Good, Fair, Poor, Very Bad, Don't Know/Don't Think)

Table 4 shows generally high acceptance of videoconferencing platforms, with positive evaluations averaging 39.9% and particularly high levels for Google Meet and Zoom, while negative perceptions remained low. However, the substantial proportion of neutral responses suggests that the predominantly expository use of these platforms does not always result in fully positive learning experiences, possibly due to limited use of complementary pedagogical tools and constraints related to session design and time management. Significant differences by gender, age, and academic semester reinforce previous findings highlighting a direct relationship between students' perceptions of virtual learning environments and their satisfaction levels (Cruzado, 2016).

Table 7 Perception of interoperability platforms for videoconferencing (Cisco Webex, Google meet, Zoom, Microsoft Team) used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
What is your perception of the Cisco Webex virtual environment?																
Excellent	4	3.6	4	3.6	8	7.1	0	0.0	8	7.1	0	0.0	0	0.0	8	7.1
Good	6	5.4	11	9.8	17	15.2	5	4.5	10	8.9	2	1.8	0	0.0	17	15.2
Regular	16	14.3	25	22.3	41	36.6	15	13.4	26	23.2	0	0.0	0	0.0	41	36.6
Suitcase	0	0.0	2	1.8	2	1.8	1	0.9	0	0.0	0	0.0	1	0.9	2	1.8
Very bad	5	4.5	1	0.9	6	5.4	2	1.8	4	3.6	0	0.0	0	0.0	6	5.4
No know/No opinion	14	12.5	24	21.4	38	33.9	16	14.3	20	17.9	2	1.8	0	0.0	38	33.9
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	112	100.0

What is your perception of the virtual environment Google meet?

Excellent	16	14.3	13	11.6	29	25.9	7	6.3	22	19.6	0	0.0	0	0.0	29	25.9
Good	17	15.2	37	33.0	54	48.2	22	19.6	27	24.1	4	3.6	1	0.9	54	48.2
Regular	9	8.0	15	13.4	24	21.4	9	8.0	15	13.4	0	0.0	0	0.0	24	21.4
Suitcase	2	1.8	1	0.9	3	2.7	0	0.0	3	2.7	0	0.0	0	0.0	3	2.7
Very bad	0	0.0	1	0.9	1	0.9	1	0.9	0	0.0	0	0.0	0	0.0	1	0.9
No know/No opinion	1	0.9	0	0.0	1	0.9	0	0.0	1	0.9	0	0.0	0	0.0	1	0.9
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	112	100.0

What is your perception of the Zoom virtual environment?

Excellent	8	7.1	5	4.5	13	11.6	0	0.0	13	11.6	0	0.0	0	0.0	13	11.6
Good	12	10.7	24	21.4	36	32.1	15	13.4	19	17.0	2	1.8	0	0.0	36	32.1
Regular	20	17.9	28	25.0	48	42.9	18	16.1	28	25.0	2	1.8	0	0.0	48	42.9
Suitcase	0	0.0	7	6.3	7	6.3	1	0.9	5	4.5	0	0.0	1	0.9	7	6.3
Very bad	1	0.9	2	1.8	3	2.7	2	1.8	1	0.9	0	0.0	0	0.0	3	2.7
No know/No opinion	4	3.6	1	0.9	5	4.5	3	2.7	2	1.8	0	0.0	0	0.0	5	4.5
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	112	100.0

What is your perception of the Microsoft Team virtual environment?

Excellent	5	4.5	3	2.7	8	7.1	0	0.0	8	7.1	0	0.0	0	0.0	8	7.1
Good	4	3.6	10	8.9	14	12.5	4	3.6	7	6.3	3	2.7	0	0.0	14	12.5
Regular	21	18.8	33	29.5	54	48.2	18	16.1	34	30.4	1	0.9	1	0.9	54	48.2
Suitcase	3	2.7	4	3.6	7	6.3	2	1.8	5	4.5	0	0.0	0	0.0	7	6.3
Very bad	5	4.5	2	1.8	7	6.3	3	2.7	4	3.6	0	0.0	0	0.0	7	6.3

No know/No opinion	7	6.3	1	13.	22	19.	1	10.	10	8.9	0	0.0	0	0.0	22	19.6
Total	4	40	6	59.	11	10	3	34.	68	60.	4	3.6	1	0.9	11	100.
	5	.2	7	8	2	0.0	9	8		7					2	0

Note. The table presents data on participants' perceptions in six categories (Excellent, Good, Fair, Poor, Very Bad, Don't Know/Don't Think)

Table 5 indicates a generally positive perception of educational tools within interoperability platforms, particularly Google Classroom, with 48.2% of participants rating it as excellent or good and only a small proportion expressing negative evaluations. The high share of regular and neutral responses suggests broad but heterogeneous use of the tool among students. Overall, the results indicate that Classroom is widely accepted and commonly used, supporting previous evidence that sustained use of virtual classrooms contributes to improvements in pedagogical development for both teachers and students (Pino, 2015). Additionally, these findings are consistent with prior research highlighting the importance of grounding virtual environments in pedagogical praxis to foster more dynamic and collaborative teaching-learning processes Ortiz y Nuñez (2019).

Table 8 Perception of the tools for educational use included within the interoperability platforms (classroom) used by students in their learning process

SCALE	Gender				Semester								Total			
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
What is your perception of the Cisco Webex virtual environment?																
Excellent	5	4.5	9	8.0	14	12.5	2	1.8	1	10.	0	0.0	0	0.0	14	12.5
Good	1	11	2	24.	40	35.	1	15.	2	18.	2	1.8	0	0.0	40	35.7
	3	.6	7	1		7	7	2	1	8						
Regular	2	17	2	20.	43	38.	1	14.	2	22.	1	0.9	1	0.9	43	38.4
	0	.9	3	5		4	6	3	5	3						
Suitcase	2	1.8	3	2.7	5	4.5	0	0.0	5	4.5	0	0.0	0	0.0	5	4.5
Very bad	0	0.0	1	0.9	1	0.9	1	0.9	0	0.0	0	0.0	0	0.0	1	0.9
No know/No opinion	5	4.5	4	3.6	9	8.0	3	2.7	5	4.5	1	0.9	0	0.0	9	8.0

Total	4	40	6	59.	11	10	3	34.	6	60	4	3.6	1	0.9	11	100.
	5	.2	7	8	2	0.0	9	8	8	.7					2	0

Note. The table presents data on participants' perceptions in six categories (Excellent, Good, Fair, Poor, Very Bad, Don't Know/Don't Think)

Table 6 presents students' perceptions regarding the use of collaborative tools, particularly WhatsApp. The results indicate a predominantly positive evaluation, with 31.3% of participants rating the platform as excellent and 47.3% as good, while 18.8% expressed a neutral perception. Negative evaluations (bad and very bad) were minimal, representing only 1.8%, and a small proportion of respondents reported no clear opinion (0.9%). Overall, the predominance of the "good" and "excellent" categories suggests broad acceptance of WhatsApp as a collaborative tool in the teaching-learning process. The limited presence of negative perceptions indicates general usability and familiarity with the application. These findings are consistent with Cabero et al. (2018), who argue that access to mobile technologies facilitates the integration of ICT in educational contexts, and with Flowers (2018), who notes that although students initially experience difficulties with new virtual environments, continued use and practice lead to greater ease and acceptance.

Table 9 Perception of other tools for educational use used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
What is your perception of the virtual environment WhatsApp?																
Excellent	14	12.5	21	18.8	35	31.3	8	7.1	27	24.1	0	0.0	0	0.0	35	31.3
Good	19	17.0	34	30.4	53	47.3	24	21.4	25	22.3	3	2.7	1	0.9	53	47.3
Regular	11	9.8	10	8.9	21	18.8	6	5.4	14	12.5	1	0.9	0	0.0	21	18.8
Suitcase	0	0.0	1	0.9	1	0.9	0	0.0	1	0.9	0	0.0	0	0.0	1	0.9
Very bad	0	0.0	1	0.9	1	0.9	1	0.9	0	0.0	0	0.0	0	0.0	1	0.9
No know/No opinion	1	0.9	0	0.0	1	0.9	0	0.0	1	0.9	0	0.0	0	0.0	1	0.9

Total	4	40	6	59	1	10	3	34.	6	60.	4	3.6	1	0.9	11	100.
	5	.2	7	.8	2	0.0	9	8	8	7					2	0

Note. The table presents data on participants' perceptions in six categories (Excellent, Good, Fair, Poor, Very Bad, Don't Know/Don't Think)

Level of student satisfaction with the virtual environments used in their learning process

To assess students' perceptions of satisfaction with the use of virtual learning environments in the teaching-learning process at the Faculty of Social Sciences of the National University of the Altiplano (Puno), satisfaction was examined across five key dimensions: overall satisfaction with virtual learning environments, quality of online resources, ease of navigation, online assessment processes, and teachers' communication and availability in virtual environments.

Table 7 summarizes students' satisfaction with the virtual learning environments used in their academic training at the Faculty of Social Sciences of the National University of the Altiplano (Puno). The combined categories of very satisfied and satisfied indicate an overall acceptable level of satisfaction, with positive responses exceeding 50% on average across the evaluated dimensions (57.2%, 59.0%, 52.7%, and 44.7%). In contrast, dissatisfaction levels (dissatisfied and very dissatisfied) were comparatively low (6.3%, 6.3%, 12.5%, and 11.6%), although the institutional virtual environment of UNAP showed the highest dissatisfaction rate (12.5%). Neutral responses were also notable (36.6%, 34.8%, 34.8%, and 42.9%), suggesting moderate overall satisfaction and highlighting areas requiring improvement. The presence of neutral and negative perceptions underscores the need to further examine factors influencing user experience in virtual environments, in line with Sánchez & Morales (2012), who emphasize the relevance of virtual tools—particularly Moodle—for organizing teaching activities and facilitating information exchange, albeit with more limited potential for collaboration.

Table 10 Perception of the level of satisfaction of virtual environments used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
How would you rate your overall level of satisfaction with your experience with virtual university environments so far?																
Very satisfied	8	7.1	7	6.3	15	13.4	2	1.8	13	11.6	0	0.0	0	0.0	15	13.4

Satisfied	20	17.9	2.9	25.9	49	43.8	1.4	12.5	33	29.5	2	1.8	0	0.0	49	43.8
Neutral	15	13.4	2.6	23.2	41	36.6	1.9	17.0	19	17.0	2	1.8	1	0.9	41	36.6
Unsatisfied	2	1.8	3	2.7	5	4.5	2	1.8	3	2.7	0	0.0	0	0.0	5	4.5
Very dissatisfied	0	0.0	2	1.8	2	1.8	2	1.8	0	0.0	0	0.0	0	0.0	2	1.8
Total	45	40.2	6.7	59.8	112	100.0	3.9	34.8	68	60.7	4	3.6	1	0.9	112	100.0

Are you satisfied with the virtual environments used in your educational background?

Very satisfied	7	6.3	1.0	8.9	17	15.2	3	2.7	14	12.5	0	0.0	0	0.0	17	15.2
Satisfied	18	16.1	3.1	27.7	49	43.8	1.7	15.2	30	26.8	2	1.8	0	0.0	49	43.8
Neutral	18	16.1	2.1	18.8	39	34.8	1.5	13.4	21	18.8	2	1.8	1	0.9	39	34.8
Unsatisfied	1	0.9	4	3.6	5	4.5	3	2.7	2	1.8	0	0.0	0	0.0	5	4.5
Very dissatisfied	1	0.9	1	0.9	2	1.8	1	0.9	1	0.9	0	0.0	0	0.0	2	1.8
Total	45	40.2	6.7	59.8	112	100.0	3.9	34.8	68	60.7	4	3.6	1	0.9	112	100.0

Are you satisfied with the virtual environment that UNA Puno is applying?

Very satisfied	5	4.5	6	5.4	11	9.8	3	2.7	14	12.5	0	0.0	0	0.0	11	15.2
Satisfied	22	19.6	2.6	23.2	48	42.9	1.7	15.2	30	26.8	2	1.8	0	0.0	49	43.8
Neutral	13	11.6	2.6	23.2	39	34.8	1.5	13.4	21	18.8	2	1.8	1	0.9	39	34.8
Unsatisfied	4	3.6	5	4.5	9	8.0	3	2.7	2	1.8	0	0.0	0	0.0	5	4.5

Very dissatisfied	1	0.9	4	3.6	5	4.5	1	0.9	1	0.9	0	0.0	0	0.0	2	1.8
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	112	100.0
How would you rate your overall level of satisfaction with the virtual environment used in your university courses?																
Very dissatisfied	2	1.8	3	2.7	5	4.5	4	3.6	1	0.9	0	0.0	0	0.0	5	4.5
Unsatisfied	2	1.8	6	5.4	8	7.1	6	5.4	2	1.8	0	0.0	0	0.0	8	7.1
Neutral	21	18.8	27	24.1	48	42.9	17	15.2	29	25.9	2	1.8	0	0.0	48	42.9
Satisfied	13	11.6	19	17.0	32	28.6	9	8.0	20	17.9	2	1.8	1	0.9	32	28.6
Very satisfied	7	6.3	11	9.8	18	16.1	2	1.8	16	14.3	0	0.0	0	0.0	18	16.1
Total	45	40.2	66	58.9	111	99.1	38	33.9	68	60.7	4	3.6	1	0.9	111	99.1

Table 8 presents students' satisfaction with the quality of online resources provided by the university for their learning process. The results indicate that 38.4% of students reported being satisfied and 15.2% very satisfied, yielding an overall positive satisfaction level of 53.6%. In contrast, 34.8% of respondents expressed neutral opinions, while smaller proportions reported dissatisfaction (8.0%) or strong dissatisfaction (3.6%), totaling 11.6%. Overall, these findings reveal a generally positive perception of the quality of online resources, accompanied by a considerable proportion of neutral responses, suggesting uncertainty or mixed experiences among students. The presence of dissatisfaction highlights the need to further explore the factors influencing these perceptions in order to improve the quality of institutional learning resources. These results are consistent with Manrique & Sánchez (2019), who emphasize the decisive role of academic monitors as continuous advisors who support and motivate students in virtual education processes.

Table 11 Perception of the level of satisfaction with the quality of the online resources used by students in their learning process

Gender	Semester
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SCALE	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
How satisfied are you with the quality of the online resources (study materials, learning platforms, digital libraries, etc.) provided by the university?																
Very satisfied	5	4.5	12	10.7	17	15.2	3	2.7	14	12.5	0	0.0	0	0.0	17	15.2
Satisfied	19	17.0	24	21.4	43	38.4	1	9.8	30	26.8	2	1.8	0	0.0	43	38.4
Neutral	15	13.4	24	21.4	39	34.8	1	15.7	19	17.0	2	1.8	1	0.9	39	34.8
Unsatisfied	4	3.6	5	4.5	9	8.0	5	4.5	4	3.6	0	0.0	0	0.0	9	8.0
Very dissatisfied	2	1.8	2	1.8	4	3.6	3	2.7	1	0.9	0	0.0	0	0.0	4	3.6
Total	45	40.2	67	59.8	112	100.0	3	34.9	68	60.7	4	3.6	1	0.9	112	100.0

Table 9 presents students' levels of satisfaction with the usability and ease of navigation of online learning platforms. The results indicate that 49.1% of respondents were satisfied and 10.7% very satisfied, resulting in an overall positive satisfaction level of 59.8%. In contrast, lower proportions reported dissatisfaction (4.5%) or strong dissatisfaction (1.8%), totaling 6.3%, while a considerable percentage remained neutral (33.9%). Overall, these findings suggest relatively high satisfaction with platform usability and navigation, accompanied by a notable proportion of neutral responses, which may reflect uncertainty or mixed experiences among users. Further exploration of the factors underlying neutrality and dissatisfaction could provide valuable insights to enhance platform usability. These results are consistent with the findings of Inzunza et al. (2012), who report positive student acceptance of virtual environments as an important complement to face-to-face instruction and as a means of fostering more active participation.

Table 12 Perception of the level of satisfaction with the ease of navigation of the virtual environments used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%

How would you rate the usability and ease of navigation of the online learning platform?																	
Very satisfied	7	6.3	5	4.5	12	10.7	3	2.7	9	8.0	0	0.0	0	0	0	0.1	10.2
Satisfied	21	18.8	34	30.4	55	49.1	16	14.3	3	31.3	3	2.7	1	0.9	0	0.5	49.1
Neutral	15	13.4	23	20.5	38	33.9	16	14.3	2	18.1	1	0.9	0	0	0	0.3	33.9
Unsatisfied	2	1.8	3	2.7	5	4.5	2	1.8	3	2.7	0	0.0	0	0	0	0.5	4.5
Very dissatisfied	0	0.0	2	1.8	2	1.8	2	1.8	0	0.0	0	0.0	0	0	0	0.2	1.8
Total	45	40.2	67	59.8	112	100.0	39	34.8	6	60.7	4	3.6	1	0.9	0	1.1	100.0

Table 10 presents students' levels of satisfaction with online assessment processes. The results show that 43.8% of students reported being satisfied and 17.0% very satisfied, indicating that 60.8% expressed a high level of satisfaction with online evaluations. In contrast, 31.3% of respondents remained neutral, while smaller proportions reported dissatisfaction (6.3%) or strong dissatisfaction (1.8%), representing a total of 8.1%. Overall, these findings suggest that satisfaction with online assessments is relatively high compared to dissatisfaction; however, the considerable proportion of neutral responses highlights the need to further examine the factors underlying uncertainty or mixed perceptions. Exploring the reasons behind neutrality and dissatisfaction may provide valuable insights for improving the design and implementation of online assessment processes.

Table 13 Perception of the level of satisfaction of the evaluations in the virtual environments used by students in their learning process

SCALE	Gender					Semester												
	M		F		Total	III		IV		V		VIII		Total				
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Very satisfied	10	8.9	9	8.0	19	17.0	4	3.6	1	13.5	0	0.0	0	0.0	0	0.0	19	17.0
Satisfied	19	17.0	30	26.8	49	43.8	19	17.0	2	24.7	2	1.8	1	0.9	1	0.9	49	43.8

Neutral	12	10.7	23	20.5	35	31.3	14	12.5	1	17.9	2	1.8	0	0	35	31.3
Unsatisfied	3	2.7	4	3.6	7	6.3	1	0.9	6	5.4	0	0	0	0	7	6.3
Very dissatisfied	1	0.9	1	0.9	2	1.8	1	0.9	1	0.9	0	0	0	0	2	1.8
Total	45	40.2	67	59.8	112	100.0	39	34.8	68	60.7	4	3.6	1	0.9	11	10.0

Table 11 shows the distribution of responses regarding the perception of teachers' time availability for communication with their students. The table shows that 41.1% remain neutral regarding the communication and availability of their teachers, 34.8% are satisfied, 9.8% are dissatisfied, 8% feel very satisfied and 6.3% feel very dissatisfied with the communication and availability of their teachers. The comparative analysis shows that most of the participants (42.8%) show levels of satisfaction or neutrality (41.1%) in the communication and availability of their teachers, however, a significant percentage is dissatisfied or very dissatisfied (16.1%) whose tendency is negative about the communication and availability of teachers in the virtual environment, we must pay attention to these dissatisfied participants to understand the specific areas they need improve, and collect specific feedback on teacher communication and availability. Fernández et al. (2013), highlight the significant level of student satisfaction with the experience and reveal the most important variables when explaining the variance in satisfaction.

Table 14 Perception of the level of satisfaction in communication and availability of teachers in the virtual environments used by students in their learning process

SCALE	Gender						Semester									
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
How would you rate the communication and availability of your teachers through the virtual environment?																
Very satisfied	3	2.7	6	5.4	9	8.0	0	0.0	9	8.0	0	0	0	0	9	8.0
Satisfied	16	14.3	23	20.5	39	34.8	13	11.6	24	21.4	2	1.8	0	0	39	34.8
Neutral	18	16.1	28	25.0	46	41.1	20	17.9	23	20.5	2	1.8	1	0.9	44	41.1

Unsatisfied	6	5.4	5	4.5	11	9.8	3	2.7	8	7.1	0	0.	0.	1	9.8
Very dissatisfied	2	1.8	5	4.5	7	6.3	3	2.7	4	3.6	0	0.	0.	7	6.3
Total	45	40.	67	59.	11	10	39	34.	6	60.	4	3.	0	1	100
		2		8	2	0.0		8	8	7		6	1	9	2
														1	.0
														2	

Table 12 reflects heterogeneous student perceptions of virtuality as a teaching-learning method, combining both positive and negative viewpoints. While some students reported unfavorable perceptions related to boredom, limited participation, and the inadequacy of virtual education for practical courses, others emphasized benefits such as the development of technological skills, self-directed learning, improved feedback through recorded classes, and the usefulness of virtual education in specific contextual situations. The predominance of non-responses suggests a largely neutral stance or the absence of strong opinions. Overall, these findings are consistent with previous research indicating that students' perceptions of virtual education tend to be moderately favorable and are strongly influenced by the quality of didactic strategies, particularly those related to activation, organization, evaluation, and feedback processes Ochoa (2021).

Table 15 Perception of suggestions for the use of virtual environments used by students in their learning process

SCALE	Gender				Semester											
	M		F		Total		III		IV		V		VIII		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%

Are there any additional comments you would like to add about your experience with virtual environments or your perceptions as a student?

Virtuality is not favorable for practical courses

1	0.9	4	3.6	5	4.5	2	1.8	2	1.8	1	0.	0	0.	5	4.5
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It is not a good learning method, it is boring, there is little participation, I

3	2.7	8	7.1	11	9.8	5	4.5	6	5.4	0	0.	0	0.	11	9.8
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prefer face-to-face classes

They are a good option in the event of inconvenience, strikes and work, so that students are not harmed

3 2.7 0 0.0 3 2.7 0 0.0 2 1.8 1 0.9 0 0.0 3 2.7

It must have a specific purpose for the exchange of information

0 0.0 1 0.9 1 0.9 0 0.0 1 0.9 0 0.0 0 0.0 1 0.9

Greater understanding of the teacher, they do not have a good signal, there are areas without internet, exams cannot be loaded

2 1.8 5 4.5 7 6.3 2 1.8 5 4.5 0 0.0 0 0.0 7 6.3

Procedures for tasks or projects should be better detailed

0 0.0 1 0.9 1 0.9 0 0.0 1 0.9 0 0.0 0 0.0 1 0.9

It helps to exploit technology, confidence, be self-taught, seek more information and use virtual tools

2 1.8 7 6.3 9 8.0 0 0.0 8 7.1 1 0.9 0 0.0 9 8.0

I prefer virtual classes because it can be recorded and it helps with feedback	0	0.0	5	4.5	5	4.5	4	3.6	0	0.0	1	0.9	0	0.0	5	4.5	
None	3	30.4	3	32.6	70	62.5	26	23.2	4	38.3	4	0	0.0	1	0.9	70	62.5
Total	4	40.5	6	59.2	11	10.8	39	34.8	6	60.8	7	4	3.6	1	9.2	11	10.0

Overall, the results show that students’ perceptions of virtual learning environments do not depend solely on technological availability, but rather on how these tools are pedagogically integrated into the teaching–learning process. The high valuation of videoconferencing platforms such as Google Meet and Zoom suggests that students prioritize immediacy, synchronous interaction, and ease of access; however, the persistence of neutral responses indicates that when these platforms are used predominantly for expository purposes, they do not always succeed in generating deep or meaningful learning experiences (Garzón-Domínguez et al., 2024). This finding is consistent with previous studies emphasizing that technology alone does not guarantee educational improvement unless it is accompanied by active and participatory instructional strategies.

Similarly, the moderate perception of integrated systems such as Moodle and Laurassia reveals a gap between their pedagogical potential and their effective use by both instructors and students. Although these platforms allow for comprehensive learning management, the high proportions of “fair” and “don’t know/no opinion” responses suggest limitations in digital training, institutional support, and functional appropriation of their tools. This result aligns with research conducted in Latin American university contexts, which indicates that insufficient faculty training in virtual environments reduces the positive impact of learning management systems on student performance and satisfaction.

On the other hand, the high acceptance of informal collaborative tools such as WhatsApp highlights the importance of fluid communication, immediacy, and technological familiarity in virtual educational processes (Rosanigo et al., 2016). The preference for these applications suggests that students value less rigid and more accessible interaction spaces, which raises the challenge of pedagogically integrating such tools without replacing formal institutional environments. In this regard, the strategic use of messaging applications can complement official systems by

strengthening communication, collaborative work, and academic support, particularly in contexts with connectivity limitations.

Finally, the reported satisfaction levels reflect a general acceptance of virtuality as an educational modality, albeit with important reservations related to faculty communication, online assessment, and the overall quality of the learning experience (Kardoyo et al., 2023). The high proportion of neutral responses suggests an ambivalent perception that may be interpreted as an ongoing adaptation phase. These findings underscore the need to strengthen institutional policies aimed at continuous faculty training, improved instructional design, and the diversification of active methodologies in virtual environments. In this way, virtual education can be consolidated not only as a contingent solution but also as a sustainable and high-quality alternative in public higher education.

Conclusions

The findings indicate that, while virtual learning environments provide notable flexibility and accessibility, students' perceptions remain heterogeneous. A substantial proportion of students acknowledge the benefits of these environments, particularly videoconferencing platforms, emphasizing the convenience of self-paced learning. Nevertheless, the results also identify areas requiring improvement, especially regarding the quality of interaction and the management of technical issues. Overall, students reported an acceptable level of satisfaction; however, continuous refinement in the implementation and pedagogical use of virtual technologies is necessary to better align them with academic demands.

Students' perceptions of virtual learning environments can be categorized into three functional types based on interoperability, flexibility, and ease of use: integrated learning management systems (e.g., Laurasia and Moodle), videoconferencing interoperability platforms (e.g., Cisco Webex, Google Meet, Zoom, and Microsoft Teams), and instant messaging and complementary educational tools (e.g., WhatsApp, Telegram, Google Classroom, Jamboard, and Google Docs). The results indicate that videoconferencing platforms were the most preferred for virtual teaching, particularly Google Meet (74.1%) and Zoom (43.7%), compared with classroom-based platforms (35.7%) and instant messaging tools such as WhatsApp (47.3%). Overall, the findings reveal heterogeneous student perceptions, including positive evaluations related to accessibility and flexibility, as well as negative perceptions associated with technical difficulties and limited interaction. These insights provide an initial empirical basis for improving the implementation and pedagogical use of virtual learning environments.

Ethical Declaration

This study followed internationally accepted ethical standards, ensuring voluntary participation, informed consent, and full anonymity of respondents. The research involved minimal risk, collected no personal identifiers, and used the data exclusively

for academic purposes, in compliance with institutional ethical guidelines and best practices in educational research.

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