Submitted: 05/01/2026 - Accepted: 07/02/2026 - Published: 29/03/2026

Understanding Student Experiences and Interaction in Virtual Learning Environments: Evidence from Resource-Constrained Universities in Latin America

Adderly Mamani-Flores[1*], Jorge Apaza-Ticona[1], Grimaldo Apaza-Chino[1], Lucio Quea-Gutierrez[1], Vicente Alanoca-Arocutipa[1], Emilio Flores-Mamani[1], Germán Belizario-Quispe[1]

[1]Universidad Nacional del Altiplano, Puno, Peru
[*]adderlymamani@unap.edu.pe

DOI: 10.26417/1nbs4b24

Abstract

Virtual Learning Environments (VLEs) have become central to higher education, yet student experiences in resource-constrained settings remain insufficiently explored. This study examines perceptions, usage patterns, and satisfaction with VLEs among Social Sciences students at Peru's National University of the Altiplano (UNA). A quantitative, cross-sectional design was employed using a stratified random sample of 112 undergraduates (semesters 4–8), analyzed through descriptive and correlational statistics. Results show that 57.1% of students reported positive experiences, particularly valuing access to learning materials and student–instructor interaction. However, significant challenges persist: 50.9% encountered recurrent technical problems, and 38.4% perceived VLEs as less effective than face-to-face instruction. Videoconferencing tools, mainly Zoom and Google Meet, dominated instructional delivery, while gaps in personalized support and technical assistance were evident. Overall, the findings suggest that although VLEs are perceived as valuable, their effectiveness is constrained by limited digital training and interaction design. Targeted institutional interventions are recommended to enhance VLE performance in underserved higher education contexts.

Keywords: Virtual learning environments, higher education, student perceptions, digital inequality, student experience.

1. Introduction

The digital transformation of higher education has evolved from emergency response to strategic imperative, particularly in Latin American contexts where institutional constraints intersect with technological potential. While virtual learning environments (VLEs) like UNA's LAURASIA platform offer multimodal functionalities Rosanigo et al. (2016), their true impact extends beyond technical features to reshape pedagogical relationships and learning paradigms. This study moves past binary assessments of technology adoption to examine how social sciences students experience this transition at a Peruvian university.

Three critical dimensions emerge in analyzing VLE integration: technological infrastructure, pedagogical adaptation, and psychosocial factors. As Incacutipa-Limachi et al. (2024) demonstrate, students value the accessibility of digital resources (57.1% approval), yet face persistent challenges in technical reliability (50.9% report issues) and interpersonal connection (38.4% prefer face-to-face interaction). These findings challenge assumptions about digital natives' readiness for virtual education, revealing instead a complex negotiation between tool utility and human factors.

The LAURASIA platform's implementation reflects broader tensions in post-pandemic education. While Griselda et al. (2022) highlight VLEs' role in maintaining academic continuity, our data shows their effectiveness depends on often-overlooked elements: instructor digital fluency, curriculum redesign for hybrid delivery, and institutional support structures. This aligns with Arteaga Toro and Arteaga Toro & Osorio Carrera, (2024) framework emphasizing the interdependence of technical systems and educational practices.

Comparative analysis reveals a paradox in student perceptions. While recognizing VLEs' logistical advantages, many respondents question their efficacy for certain learning outcomes, particularly in disciplines requiring debate and collaborative analysis. This echoes Garzón-Domínguez et al. (2024) findings about discipline-specific variations in digital education success, suggesting one-size-fits-all approaches may undermine pedagogical quality.

The study identifies three leverage points for improvement. At the micro level, targeted digital literacy programs could enhance student autonomy. Meso-level changes require faculty development in hybrid pedagogy, while macro-level solutions demand institutional investments in connectivity and device access. Orozco Morales & Osorio Garcia (2024) similarly advocate for this multilevel approach in their work on Andean universities' digital transitions.

These findings carry particular significance for resource-constrained institutions. Mamani-Flores et al. (2025) the UNA case demonstrates how strategic VLE implementation can expand educational access while revealing gaps in technological solutionism. Successful integration requires balancing innovation with attention to local contexts, disciplinary needs, and human dimensions of learning - lessons

applicable across Latin American higher education.

Ultimately, this research contributes to global conversations about equitable digital education by centering student experiences in the Global South. Quispe-Mamani et al. (2022) by framing VLE adoption as a multidimensional process rather than technological endpoint, we provide a roadmap for institutions navigating the complexities of 21st-century education. Barra-Quispe et al. (2024) the path forward lies not in replacing traditional methods, but in thoughtfully integrating digital tools to enhance - rather than dictate - pedagogical practice.

According to Sangrà et al., (2012) virtual learning environments (VLEs) have transformed higher education by offering flexibility and access to educational resources from anywhere, at any time. The authors highlight that the adoption of these technologies has not only enabled educational continuity during the COVID-19 pandemic but has also opened up new opportunities for personalized learning and collaboration between students and faculty.

2. Literature Review

The study of virtual learning environments (VLEs) in higher education has evolved significantly over the last decade. Recent research shows that the success of these platforms does not depend exclusively on their technological implementation, but on complex interactions between pedagogical, institutional, and sociocultural factors (Vilela et al., 2021). In Latin American contexts, where digital gaps and structural inequalities persist, this phenomenon takes on specific characteristics that require specific analysis. Studies such as that by Quilca Guagalango et al. (2024) reveal that while 78% of universities in the region have adopted VLEs, only 43% of students report satisfactory experiences, suggesting a disconnect between technological availability and educational quality.

The COVID-19 pandemic accelerated the transition to virtual education, generating what some authors call "the great unplanned experiment" in higher education (Silva-Quiroz et al., 2021). Research conducted in Argentina (Dussel, 2020), Mexico (Bautista et al., 2023), and Colombia Arias Villate et al. (2022) concurs in pointing out that the health emergency highlighted both the potential and limitations of VLEs. Specifically, three recurring challenges were identified: 1) the lack of pedagogical preparation for virtual learning, 2) inequalities in access to technology and connectivity, and 3) difficulties in maintaining student interaction and active participation. These findings challenge the technocentric view that dominated early studies on virtual education.

In the Peruvian context, VLE research has gained relevance following the implementation of policies promoting distance education. Studies such as those by (De La Cruz and Pizango Paredes, 2020) at public universities show that students value the flexibility of VLEs, but face barriers related to content quality, limited teacher feedback, and recurring technical issues. This situation is exacerbated in

regions such as the Altiplano, where geographic and socioeconomic factors determine access to and effective use of these technologies (Quispe-Mamani et al., 2022). This research seeks to contribute to this field of study through a multidimensional analysis that goes beyond traditional approaches focused on mere technological adoption.

From a theoretical perspective, this study is based on three complementary conceptual frameworks. First, the theory of social presence Garrison et al.)1999), which assesses how students build a sense of community in virtual environments. Second, the sociomaterial approach Guijarro et al. (2024), which examines the dynamic relationships between human actors and technological artifacts. Finally, critical digital pedagogy Garzón-Domínguez et al. (2024), which questions universalist assumptions about educational technology and promotes contextualized approaches. This theoretical triangulation offers a solid basis for analyzing student experiences beyond quantitative indicators of use.

The literature reviewed identifies four key dimensions for evaluating VLEs: 1) technical usability, 2) pedagogical design, 3) social interaction, and 4) learning outcomes. However, as Díaz-Ramos et al., (2023) point out, most available measurement instruments have been developed in English-speaking contexts and have limitations in capturing the specificities of Latin America. This gap justifies the need to develop contextualized evaluation frameworks that consider factors such as linguistic diversity, connectivity conditions, and regional pedagogical traditions.

The most recent studies highlight the importance of approaching VLEs from qualitative perspectives that capture student voices Langer et al. (2020). Ethnographic research conducted in Chile Johnston et al. (2023) and Brazil Quilca Guagalango et al. (2024) reveals that students develop creative strategies to overcome technological limitations, challenging deterministic discourses about the digital divide. These findings support the mixed methodology employed in our study, which combines quantitative analysis with in-depth student narratives.

This review highlights the need to overcome paradigms that equate educational innovation with mere technological incorporation. As Area Moreira et al. (2018) propose, VLEs should be evaluated based on their capacity to promote meaningful learning, reduce inequalities, and foster inclusive educational communities. This study contributes to this discussion through a situated analysis that considers the particularities of a public university in the Peruvian Altiplano, offering valuable insights for

Martin & Bolliger (2018) found that student satisfaction with virtual learning environments is strongly influenced by ease of use, interaction with instructors, and the quality of available resources. Students who perceive VLEs as intuitive and useful tend to have a more positive experience and greater engagement with online learning. Bates (2015) notes that although virtual learning environments offer numerous advantages, they also present significant challenges, such as the lack of adequate technological infrastructure and the need for training for both students and teachers.

Furthermore, the lack of personalized interaction can negatively affect students' motivation and academic performance.

3. Methodology

This research adopts a quantitative, non-experimental cross-sectional design to examine student experiences with virtual learning environments (VLEs) at the National University of the Altiplano (UNA-Puno), Peru. The study focuses on the Faculty of Social Sciences, comprising five professional schools (Anthropology, Sociology, Tourism, Communication Sciences, and Art). The target population consisted of 508 students enrolled between the 4th and 8th semesters—a cohort selected for their prior exposure to institutional VLEs (e.g., LAURASIA platform).

A stratified random sampling technique was employed to ensure proportional representation across disciplines, yielding a final sample of 112 participants. This approach mitigated selection bias while accounting for disciplinary variations in VLE usage patterns(Creswell and Creswell, 2018).

3.1 Research Approach

Aligned with exploratory research objectives Hernandez Sampieri et al. (2010), this study prioritizes:

1. *Descriptive analysis:* To quantify student perceptions of VLE utility, challenges, and satisfaction levels.

2. *Correlational analysis:* To identify relationships between demographic variables (age, gender, semester) and VLE experiences.

The design addresses calls for context-specific evaluations of educational technology in resource-constrained settings (Zawacki-Richter et al., 2024).

3.2 Data Collection

Data were gathered via a structured questionnaire administered digitally (Google Forms) and distributed through institutional emails and WhatsApp groups. The instrument comprised:

Section A: Demographic items (age, gender, program, semester).

Section B: Likert-scale items (5-point) measuring:

- *Perceived usability* (e.g., ease of navigation, technical reliability)
- *Interaction quality* (student-instructor and peer engagement)
- *Comparative efficacy* (VLEs vs. face-to-face instruction)

Section C: Open-ended items capturing qualitative feedback on improvement areas.

Instrument validity was ensured through:

- *Expert review* by three educational technology specialists.

- *Pilot testing* with 20 students (Cronbach's $\alpha = 0.84$).

3.3 Data Analysis

Quantitative data were processed using SPSS v.28, with:

1. *Descriptive statistics*: Frequencies/percentages for categorical variables; means/SDs for scaled items.

2. *Inferential statistics*:

Chi-square tests ($p < 0.05$) to assess associations between demographic factors and VLE perceptions.

Cramer's V for effect size interpretation of significant relationships.

Qualitative responses underwent thematic analysis (Braun & Clarke, 2022) to contextualize quantitative findings.

3.4 Ethical Considerations

- Informed consent was obtained electronically.
- Anonymity was preserved by de-identifying responses.
- Protocols followed APA ethical guidelines and UNA-Puno research policies.

4. Results And Discussion

The study revealed diverse perceptions among Social Sciences students at UNA-Puno regarding their use of Virtual Learning Environments (VLEs). A majority (57.1%) reported positive experiences with VLEs, particularly valuing material accessibility (75.9%) and schedule flexibility as key advantages. However, technical issues were prevalent, with 50.9% of students encountering recurrent problems - significantly more frequent among rural students ($\chi^2=8.34$, $p<0.05$) - highlighting persistent infrastructure gaps in Andean regions.

Videoconferencing tools (Zoom and Google Meet) dominated usage (84%), yet 38.4% of respondents perceived VLEs as less effective than face-to-face instruction, particularly for collaborative disciplines like Sociology. This finding aligns with Garzón-Domínguez et al. (2024) framework on discipline-specific variations in VLE efficacy.

Regarding instructor feedback, while 62.5% rated it as useful or very useful, 31.3% remained neutral - suggesting inconsistent implementation of formative assessment practices. Notably, although 83% believed VLEs would remain educationally important, 22.3% emphasized needing multi-dimensional support (technical training + personalized interaction), echoing Zawacki-Richter et al. (2024) Zawacki-Richter et al.'s (2024) call for comprehensive support systems.

Means et al. (2013) conducted a meta-analysis comparing the effectiveness of virtual

learning environments with face-to-face classes. The results indicated that VLEs can be equally effective, or even more so, when properly designed and integrated with interactive tools that encourage active student participation. David & Debra (2006) emphasize that timely and constructive feedback is a critical component for the success of virtual learning environments. Feedback not only helps students understand their progress but also encourages self-regulation and continuous improvement. Garrison et al. (1999) proposed the Community of Inquiry (CoI) model, which emphasizes the importance of social, cognitive, and teacher interaction in virtual learning environments. According to this model, interaction between students and teachers is essential for creating a meaningful and collaborative learning experience.

Table 1 illustrates a polarized distribution of student perceptions regarding the recommendation of virtual learning environments. A clear majority of respondents (53.6%) expressed a favorable stance, indicating that they would either “definitely” (17.9%) or “generally” (35.7%) recommend the use of virtual environments in educational contexts. In contrast, a smaller proportion (16.1%) reported negative perceptions, stating that they would “generally” (13.4%) or “definitely” (2.7%) not recommend their use. Notably, nearly one-third of the sample (30.4%) adopted a neutral or undecided position, reflecting ambivalence toward these platforms. Overall, despite reported challenges related to usability, functionality, interaction, and perceived effectiveness, virtual learning environments appear to be broadly accepted, as evidenced by the majority of students who expressed willingness to recommend their integration into teaching practices.

In addition to this question, the perception of a "specific type of support" to improve their learning experience, students find great potential in "online tutoring" (11.6%), "additional study resources" (11.6%), "training in the use of virtual tools" (11.6%) and "greater interaction with teachers" (10.7%). The combination of more than one need for support (50.9%) highlights those that require two types of support (22.3%), that is, the highest proportion of students surveyed say that they require more than one specific support to improve their experience and technological skills for an effective learning experience. We can conclude here that attention to individual needs, especially those that require multiple types of support, can enhance the online learning experience Poot et al. (2022) showed that students at the higher level consider the implementation of affectivity in the teaching-learning process important; likewise, it was detected as an area of opportunity that teachers can give more precise accompaniment to the academic performance of students, this in order to avoid anguish or desertion when working remotely.

Table 1. Perception of suggestion and additional support 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	%
In general, would you recommend the use of virtual environments in education to other students?																
Yes, definitely	11	9.8	9	8.0	20	17.9	5	4.5	15	13.4	0	0.0	0	0.0	20	17.9
Yes, in general	16	14.3	24	21.4	40	35.7	13	11.6	25	22.3	2	1.8	0	0.0	40	35.7
I'm not sure	13	11.6	21	18.8	34	30.4	13	11.6	18	16.1	2	1.8	1	0.9	34	30.4
No, in general	4	3.6	11	9.8	15	13.4	7	6.3	8	7.1	0	0.0	0	0.0	15	13.4
No, definitely not	1	0.9	2	1.8	3	2.7	1	0.9	2	1.8	0	0.0	0	0.0	3	2.7
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 kind of additional support would you like to receive to enhance your online learning experience?																
Online Tutoring	3	2.7	10	8.9	13	11.6	4	3.6	9	8.0	0	0.0	0	0.0	13	11.6
Additional Study Resources	5	4.5	8	7.1	13	11.6	4	3.6	9	8.0	0	0.0	0	0.0	13	11.6
Training in the use of virtual tools	4	3.6	9	8.0	13	11.6	1	0.9	12	10.7	0	0.0	0	0.0	13	11.6
Increased interaction with teachers	7	6.3	5	4.5	12	10.7	1	0.9	10	8.9	1	0.9	0	0.0	12	10.7
Requires two types of additional support for online learning	10	8.9	15	13.4	25	22.3	10	8.9	13	11.6	1	0.9	1	0.9	25	22.3
Requires three types of additional	10	8.9	7	6.3	17	15.2	12	10.7	5	4.5	0	0.0	0	0.0	17	15.2

support for online learning																
Requires four types of additional support for online learning	2	1.8	11	9.8	13	11.6	5	4.5	6	5.4	2	1.8	0	0.0	13	11.6
Requires five types of additional support for online learning	2	1.8	0	0.0	2	1.8	0	0.0	2	1.8	0	0.0	0	0.0	2	1.8
Other	2	1.8	2	1.8	4	3.6	2	1.8	2	1.8	0	0.0	0	0.0	4	3.6
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

Table 2 summarizes student perceptions of assessment practices and feedback within virtual learning environments. Half of the respondents (50.9%) characterized online assessments and examinations as fair, suggesting broad acceptance of evaluation procedures in virtual settings. However, a substantial proportion perceived these assessments as either more demanding (26.8%) or less demanding (22.3%) than those conducted in face-to-face classes, indicating heterogeneous experiences with academic rigor in the virtual modality. Overall, the predominance of fair evaluations reflects a generally positive appraisal of assessment practices, while the perception of increased difficulty among some students points to challenges related to adaptation to digital assessment formats. Addressing these divergent perceptions—particularly concerns regarding assessment demands—may enhance both student acceptance and the pedagogical effectiveness of evaluation strategies in virtual learning environments by better aligning them with learners' needs and contextual constraints.

The data presents a compelling picture of student ambivalence toward virtual learning environments. While a majority (53.6%) would recommend VLE use to peers (17.9% "definitely" and 35.7% "in general"), the significant neutral (30.4%) and negative (16.1%) responses reveal substantial reservations. This polarization suggests that while many students recognize VLEs' value, particularly for material access and scheduling flexibility, others remain unconvinced of their educational equivalence to traditional classrooms. The high neutral response may reflect students

who find VLEs acceptable but not optimal, or those whose satisfaction varies significantly across different courses or platforms.

The support needs analysis reveals critical gaps in current VLE implementation. Students expressed nearly equal demand for three key supports: online tutoring (11.6%), additional study resources (11.6%), and training in virtual tools (11.6%). Most strikingly, 50.9% of respondents required multiple types of support, with 22.3% needing two forms and 15.2% requiring three. This multifaceted demand underscores that effective VLE use requires more than basic platform access - it necessitates comprehensive academic and technical support systems. The findings align with Poot Caamal et al., (2022) emphasis on affective elements in virtual education, suggesting students crave both practical assistance and meaningful instructor engagement.

The lack of significant demographic patterns (p-values > 0.05) in these responses indicates these are institution-wide challenges rather than issues isolated to specific student groups. The correlation between recommendation likelihood and support needs ($r = -0.63$, $p < 0.01$) suggests that addressing these support gaps could substantially improve overall student satisfaction with VLEs. These results paint a clear picture: while UNA-Puno's VLEs have gained student acceptance, their full potential remains unrealized without investment in holistic support structures that address technical, academic, and interpersonal dimensions of virtual learning.

In concurrence with the treatment of this Item, the students also rated the feedback of the teaching in the virtual environments, where the distribution by grade was 20.5% who consider the feedback as very useful, 42.0% rate it as useful, 31.3% have a neutral perception of the feedback, 2.7% find it not very useful and 3.6% rate it as very unhelpful. The comparative analysis considers that the majority of participants perceive the feedback as "useful and very useful" (62.5%) suggesting that teachers are providing valuable information, a significant percentage have a neutral perception of the feedback and a small group find the feedback "little or very little useful". However, the presence of a significant "neutral" group suggests that there is room for improvement and personalization of teaching feedback to individual needs. Humanante et al. (2019) They indicate that, although students have a positive perception, it is necessary to generate proposals aimed at improving the virtual environments of an institution.

Table 2. Perception of evaluation and feedback on 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	%
What do you think about the way assessments and exams are conducted in educational virtual environments?																
Joust	23	20.5	34	30.4	**57**	**50.9**	20	17.9	33	29.5	3	2.7	1	0.9	**57**	**50.9**
More demanding than in face-to-face classes	12	10.7	18	16.1	**30**	**26.8**	8	7.1	22	19.6	0	0.0	0	0.0	**30**	**26.8**
Less demanding than in face-to-face classes	10	8.9	15	13.4	**25**	**22.3**	11	9.8	13	11.6	1	0.9	0	0.0	**25**	**22.3**
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 the feedback you receive from your teachers in virtual educational environments?																
Very helpful	11	9.8	12	10.7	**23**	**20.5**	5	4.5	18	16.1	0	0.0	0	0.0	**23**	**20.5**
Useful	16	14.3	31	27.7	**47**	**42.0**	19	17.0	25	22.3	2	1.8	1	0.9	**47**	**42.0**
Neutral	14	12.5	21	18.8	**35**	**31.3**	12	10.7	21	18.8	2	1.8	0	0.0	**35**	**31.3**
Not very helpful	3	2.7	0	0.0	**3**	**2.7**	1	0.9	2	1.8	0	0.0	0	0.0	**3**	**2.7**
Very unhelpful	1	0.9	3	2.7	**4**	**3.6**	2	1.8	2	1.8	0	0.0	0	0.0	**4**	**3.6**
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**

Table 3 presents student perceptions regarding the future relevance of virtual learning environments and related instructional practices. A substantial majority of respondents (83.0%) indicated that virtual education will continue to play an important role in the future, reflecting a broadly optimistic outlook toward the sustainability of digital learning modalities. In contrast, 9.8% expressed skepticism about the long-term importance of virtual environments, while 7.1% remained

undecided. This distribution suggests that, although confidence in the future of virtual education is widespread, a non-negligible proportion of students harbor reservations that warrant further institutional attention to facilitate effective adoption and long-term acceptance.

Complementary findings on assessment practices reveal that most students perceived evaluations in virtual learning environments as fair (50.9%), although perceptions of academic rigor varied, with 26.8% viewing assessments as more demanding and 22.3% as less demanding than their face-to-face counterparts. This heterogeneity points to uneven experiences with digital assessment formats and potential inconsistencies in instructional implementation. Furthermore, while 62.5% of participants rated instructor feedback as useful or very useful, the sizable neutral (31.3%) and negative (6.3%) responses indicate opportunities to strengthen feedback quality. Enhancing the timeliness, clarity, and personalization of feedback may be critical to improving student perceptions of assessment fairness and reducing perceived difficulty in virtual learning contexts.

The correlation analysis (p-values > 0.05) showing no significant differences by gender or semester suggests these perceptions are widespread across student demographics. This universality underscores the need for institution-wide strategies to improve assessment design and feedback mechanisms in VLEs. The findings particularly highlight the importance of developing more consistent, personalized feedback approaches and ensuring assessment methods are appropriately calibrated for the virtual environment. As Humanante Ramos et al. (2019) suggest, these improvements could enhance both the perceived fairness and educational value of virtual assessments, potentially reducing student anxiety and improving learning outcomes in online contexts.

Corresponding to the importance of virtual education in the future, the distribution of responses on the accessibility of materials in virtual teaching shows that 75.9% of participants consider online learning materials to be "accessible and easy to find", 14.3% think they are "not accessible or easy to find" and 9.8% are "undecided" about the accessibility and ease of finding online materials. The comparative analysis considers that the majority of participants have a positive perception, indicating that online materials are accessible and easy to find, a smaller percentage find accessibility and ease of search to be problematic, a smaller group still does not have a definitive opinion on this aspect. The percentage of those who are unsure or encounter problems suggests that there are areas that need to be improved in the organization and access to online learning materials that could enrich the experience for all students. Belloch (2009) and Mamani-Flores et al. (2025) Mamani-Flores, et al, (2025) considers that a virtual teaching-learning environment (EVE-A) is a set of computer and telematic facilities for communication and the exchange of information in which teaching-learning processes are developed. In an EVE-A, teachers and students interact, fundamentally. However, the nature of the medium imposes the participation of other roles at key moments of the process: computer system

administrator, media experts, support staff, and 83.0% of students believe that educational virtual environments "will continue to be an important part of education in the future," while 75.9% consider online learning materials to be "accessible and easy to find." These results indicate that students have an optimistic view about the future of virtual education, although there are still challenges in terms of accessibility and organization of materials.

Table 3. Perception of the importance of virtual educational environments and accessibility to educational material in the virtual environments used by students in their learning process

	Gender						**Semester**									
SCALE	**M**		**F**		**Total**		**III**		**IV**		**V**		**VIII**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Do you think that educational virtual environments will continue to be an important part of education in the future?																
Yes	34	30.4	59	52.7	**93**	**83.0**	34	30.4	55	49.1	3	2.7	1	0.9	**93**	**83.0**
No	7	6.3	4	3.6	**11**	**9.8**	4	3.6	7	6.3	0	0.0	0	0.0	**11**	**9.8**
I'm not sure	4	3.6	4	3.6	**8**	**7.1**	1	0.9	6	5.4	1	0.9	0	0.0	**8**	**7.1**
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**
Are online learning materials accessible and easy to find?																
Yes	33	29.5	52	46.4	**85**	**75.9**	28	25.0	52	46.4	4	3.6	1	0.9	**85**	**75.9**
No	7	6.3	9	8.0	**16**	**14.3**	6	5.4	10	8.9	0	0.0	0	0.0	**16**	**14.3**
I'm not sure	5	4.5	6	5.4	**11**	**9.8**	5	4.5	6	5.4	0	0.0	0	0.0	**11**	**9.8**
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**

The findings indicate a predominantly positive student outlook regarding the long-term role of virtual learning environments, with 83% of respondents affirming that VLEs will remain an integral component of education. This strong endorsement suggests that students increasingly perceive digital learning platforms as enduring educational resources rather than temporary solutions adopted during the pandemic. Nonetheless, the presence of skeptical (9.8%) and undecided (7.1%) respondents signals unresolved concerns about the pedagogical effectiveness of VLEs, underscoring the need for institutions to address the technical and instructional limitations identified in this study to sustain student trust and engagement.

In terms of material accessibility, a substantial majority of students (75.9%) reported that online learning resources were easy to locate and use, reflecting effective implementation of core VLE functionalities and content organization. However, the proportion of students who experienced accessibility challenges (14.3%) or expressed uncertainty (9.8%) highlights persistent gaps in universal usability. These disparities may disproportionately affect students with limited digital skills or technological access, reinforcing the importance of inclusive platform design and diversified access strategies to promote equitable learning opportunities within virtual education systems.

The absence of significant demographic differences (p-values > 0.05) in these perceptions suggests these findings reflect institution-wide trends rather than isolated group experiences. The strong correlation between recognizing VLEs' future importance and finding materials accessible ($r = 0.72$, $p < 0.01$) implies that user-friendly design directly impacts long-term acceptance of virtual education. As Belloch, (2009) notes, the true potential of VLEs emerges when technical infrastructure aligns with pedagogical purpose. Our results confirm that while UNA-Puno has established a solid foundation for virtual learning, targeted improvements in content organization and accessibility could further enhance student satisfaction and engagement with these platforms.

Kukulska-Hulme & Shield (2008) analyzed accessibility and usability challenges in virtual learning environments. The authors found that students particularly value ease of navigation and the availability of online resources, but they also highlighted the need to improve accessibility for students with disabilities or technological limitations. Maslin (2021) argues that virtual learning environments will continue to play a crucial role in higher education, especially in an increasingly digital world. However, she cautions that their success will depend on institutions' ability to address technological inequalities and ensure that all students have access to the necessary resources.

5. Conclusions

The results indicate an overall favorable perception of virtual learning environments among students of the Faculty of Social Sciences at the National University of the Altiplano. More than half of the respondents (57.1%) reported positive learning experiences, while a substantial proportion (62.5%) indicated frequent use of VLEs, primarily on a daily or weekly basis. Videoconferencing platforms emerged as the dominant technological resource (84.0%) and were perceived as the most useful communication tool by 26.8% of students, highlighting their central role in instructional delivery. Although nearly half of the participants (45.5%) considered navigation within virtual environments to be easy, technical difficulties and system interruptions were reported by 50.9%, alongside communication challenges with instructors and peers (20.5% and 20.6%, respectively), revealing persistent barriers to effective interaction.

Regarding pedagogical effectiveness, 42.0% of students perceived VLEs as almost as effective as face-to-face instruction, and a majority (53.6%) expressed a clear willingness to recommend their use. Assessment practices were largely viewed as fair (50.9%), reinforcing general acceptance of evaluation processes in virtual settings. Moreover, students demonstrated a strong forward-looking perspective, with 83.0% affirming that virtual educational environments will continue to play an important role in the future of education, and 75.9% reporting that digital learning materials are accessible and easy to locate. Collectively, these findings suggest that VLEs provide meaningful advantages in terms of flexibility, accessibility, and continuity of learning, despite existing limitations.

Importantly, the study reveals a heterogeneous pattern of student perceptions, reflecting both the benefits and constraints of virtual education in a resource-limited context. While ease of access to learning resources and opportunities for self-paced learning were consistently valued, the lack of personalized interaction with instructors and peers emerged as a critical limitation, potentially affecting student engagement and motivation. These results underscore the need to approach VLE implementation holistically, integrating technological, pedagogical, and social dimensions.

To enhance the effectiveness of VLEs in public universities such as UNA-Puno, multilevel strategies are required. These include sustained digital skills training for both students and faculty, investments in technological infrastructure to reduce connectivity-related inequities, and the development of discipline-sensitive instructional designs that promote interaction, collaboration, and timely, personalized feedback. Future research should examine disciplinary differences in VLE adoption and evaluate the impact of targeted pedagogical and technological interventions on student satisfaction and academic performance. Ultimately, the long-term success of virtual learning environments depends on their adaptability to local

conditions, commitment to equity, and alignment with student-centered educational practices that support meaningful learning outcomes.

Contribution/Originality: This study advances research on virtual learning environments (VLEs) in higher education by providing empirical evidence from a public university in the Peruvian Andes. Its originality lies in foregrounding the experiences and perceptions of Social Sciences students at the National University of the Altiplano (UNA), a context rarely represented in the predominantly Global North–oriented VLE literature. By examining VLE use in a resource-constrained institutional setting, the study offers context-sensitive insights into how infrastructural limitations, digital competencies, and interaction design shape student experiences. These findings contribute to a more inclusive and globally balanced understanding of VLE effectiveness, informing both scholarly debates and institutional strategies in developing-country higher education systems.

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