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Virtual education and university student satisfaction: A study at a private university in Lima

Educación virtual y satisfacción de los estudiantes universitarios: un estudio en una universidad privada de Lima

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Abstract
The objective of this research was to determine the relationship between virtual education and student satisfaction at a private university in Lima. A quantitative approach was used, with a non-experimental, descriptive, and correlational design. The sample consisted of university students who participated in virtual learning processes during the academic period under study. The results showed a low but positive correlation (r = 0.226) between the two variables, with a p-value of less than 5%, indicating a statistically significant relationship. These findings suggest that, although the relationship is not strong, it is relevant, and that virtual education has a favorable influence on student satisfaction. In addition, factors such as digital skills, the use of virtual learning resources, and teacher support were identified as elements that influence this perception. It is concluded that there is a statistically significant relationship between virtual education and student satisfaction.

Keywords: virtual education, digital skills, student satisfaction.

Resumen
La presente investigación tuvo como objetivo determinar la relación entre la educación virtual y la satisfacción de los estudiantes en una universidad privada de Lima. Se empleó un enfoque cuantitativo, con un diseño no experimental, de tipo descriptivo y correlacional. La muestra estuvo conformada por estudiantes universitarios que participaron en procesos de aprendizaje virtual durante el periodo académico en estudio. Los resultados evidenciaron una correlación baja, pero positiva (r = 0.226) entre ambas variables, con un valor de p inferior al 5 %, lo que indica una relación estadísticamente significativa. Estos hallazgos sugieren que, si bien la relación no

es alta, resulta relevante, y que la educación virtual influye de manera favorable en la satisfacción estudiantil. Además, se identificaron factores como las competencias digitales, el uso de recursos de aprendizaje virtual y el acompañamiento docente como elementos que influyen en dicha percepción. Se concluye que existe una relación estadísticamente significativa entre la educación virtual y la satisfacción de los estudiantes.

Palabras clave: educación virtual, competencias digitales, satisfacción de los estudiantes.

Introduction

Currently, educators must integrate technology and digital competencies to meet the demands of the knowledge society. The pandemic reinforced this necessity by accelerating virtual education, emphasizing the importance of maintaining pedagogical connections without overburdening those involved (Otero, 2020).

Strengthening digital literacy among educators is crucial for the effective pedagogical use of ICT, as its application remains largely limited to basic tasks. This limitation negatively impacts student learning. Leguizamón et al. (2022) identify three online solutions, highlighting educational portals as the most utilized in Latin America.

According to data from INEI (2019), only 39.3% of families in Peru have internet access, with a mere 4.8% in rural areas. Additionally, there is a deficit of 14,000 antennas needed to expand connectivity.

Henao and Zapata (2002) emphasize the lack of technological skills among educators and students in rural areas, which adversely affects learning. However, RPP Noticias (2022) reports growth in the use of virtual platforms in higher education in Peru. Universities have implemented flexible virtual programs to respond to the needs of students and workers.

Valencia (2020) indicates that virtual education utilized the Blackboard platform, which significantly influenced the analytical reasoning of students at a private university in Lima. Conversely, Carrión (2020) determined that there is no dependency between the level of use of Learning and Knowledge Technologies (TAC) and the level of digital competencies among ninth-cycle students in the Education department of a public university in Lima. According to Ballena (2021), there is a moderate relationship ($r = 0.482$) between educators' digital competencies and student academic satisfaction at a private university in Trujillo, with a significant relationship ($p = 0.009$) between the two variables. Furthermore, Tandazo (2021) explains that the digital competencies employed by educators in various virtual class environments significantly influence student satisfaction regarding their learning as future professionals.

For Mancha et al. (2022), there is a significant relationship between educators' competencies in virtual environments and student satisfaction regarding their learning outcomes. In the context of Colombia, Lanegri et al. (2019) express that digital environments are still adopted cautiously but represent an opportunity to break traditional structures, generating new symbolic territorialities and forms of power within the educational sector of three Colombian universities.

In this framework, Crisol-Moya et al. (2020) propose that virtual education represents a transformative potential to achieve global goals and promote human diversity through cognitive and symbolic processes. According to Escoda (2015), many educators feel digitally incompetent due to a lack of digital literacy, which hampers their ability to teach these skills, as it requires time, additional training, and mastery of new tools.

According to Cárdenas (2023), there is a favorable relationship between virtual education and the satisfaction of undergraduate students in the Faculty of Medical Technology at UNFV, which is at a moderate level, aligning with Bejar (2023). However, there is a noticeable gap in studies that jointly and systematically integrate virtual education, critical thinking, digital competencies, and student satisfaction, as most address these variables separately. Consequently, there is a need for comprehensive research that analyzes their interaction to enhance the quality of virtual education.

Regarding the definition of virtual education, Carrión (2020) conceives it as online teaching that relies on ICT and utilizes internet tools to provide educational environments. Similarly, Mariela and Morgado (2004) highlight that it is a high-impact strategy for improving coverage, relevance, and educational quality across all levels and types of training due to its multimedia, hypertextual, and interactive characteristics.

When addressing virtual education models, Garrison (2011) indicates that they are based on the Community of Inquiry (CoI) framework, where effective virtual education requires balancing three presences: cognitive, teaching, and social. This model adapts its principles to encompass the following dimensions: virtual learning resources (stimulating inquiry), virtual support (guided by the tutor), virtual collaboration (based on social presence), and competencies (digital and pedagogical capabilities of educators and students).

Salmon (2020), in her five-stage model, proposes that effective virtual learning development involves: access and motivation, online socialization, information exchange, knowledge construction, and autonomous development. She highlights the role of the tutor as an e-moderator, who progressively guides the process.

Meanwhile, Mishra and Koehler (2006), in their TPACK (Technological Pedagogical Content Knowledge) model, identify three key components in virtual education: content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). The intersection of these three areas enables effective integration of ICT in teaching.

Virtual education comprises digital resources, educational materials, and collaborative content (Gros, 2011a). Educators must actively support students, promoting autonomy and personalized interaction. Student competence involves acting effectively in key contexts through observable actions. According to MINEDU (2015), this integrates cognitions, skills, and attitudes with an ethical and social focus.

Regarding student satisfaction, it is considered a key indicator of educational quality. Sánchez (2018) and Álvarez et al. (2015) agree that it reflects the efficiency of academic services, faculty interactions, and the physical environment. Salinas (2018) emphasizes the student as the central axis of the educational process, whose persistence and well-being are fundamental. Together, satisfaction is directly linked to the continuous improvement of management and academic programs.

According to Bandura (1989), satisfaction in virtual education arises from the interaction between the environment, student expectations, and the role of the educator. His model guides quality policies and teacher training, considering the institution, student expectations, and teaching performance as key dimensions.

Lentell and O'Rourke (2004) highlight that academic satisfaction in distance education depends on clear communication, access to materials, faculty interaction, technical support, and perceptions of learning. This model is particularly applicable in virtual university programs. On their part, Parasuraman et al. (1988) adapted the SERVQUAL model, originally designed to measure service quality in businesses, to the educational context. It measures student satisfaction through five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. It compares student expectations with their perceptions of the experience, making it useful in educational institutions to identify areas for improvement in academic and administrative service quality.

Álvarez et al. (2015) propose that virtual educators must combine academic knowledge with specific pedagogical strategies for online education. Their performance directly influences the comprehensive education of students.

Considering all the aforementioned points, this study aims to determine the relationship between virtual education and student satisfaction, specifically at a private university in Lima, Peru.

Methodology

The study adopted a quantitative approach, as it was based on the collection and analysis of numerical data to test a hypothesis, identify patterns, and validate theories using statistical tools (Hernández et al., 2014). The type of research was descriptive, focusing on measuring and characterizing the involved variables (Hernández & Mendoza, 2018), and also correlational, as it analyzed the relationship between two variables without intervening or allowing external factors to influence them (Mancilla, 2024). Additionally, it was a non-experimental study, given that there was no manipulation of variables, and cross-sectional, as data were collected at a single point in time (Hernández-Sampieri & Mendoza, 2018).

The deductive method was used, which, according to Pino and Urías (2010), starts from general principles to reach specific conclusions, applying theories to particular cases. If the premises are correct, the conclusions will necessarily be true.

The population consisted of 450 students from the Administration program, preferably in their third to fifth years of study. According to Chero (2024), the population encompasses all cases that meet certain specific characteristics. The sample was determined by applying an appropriate statistical formula.

$$n = \frac{450 * 1.96^2\ 0.50(1 - 0.50)}{0.05^2(450 - 1) + 1.96^2 0.50(1 - 0.50)}$$

$$n = \frac{432.18}{3.04}$$

$$\mathbf{n} = 142 \text{ students}$$

Inclusion criteria encompassed students in their third, fourth, and fifth years of the Administration program. Exclusion criteria ruled out faculty members, administrative staff, the general community, and students in their first and second years of the program.

The data collection techniques and instruments were based on document analysis and surveys administered to students, serving as secondary and primary sources, respectively. This fieldwork phase was essential to ensure the validity of the study (Ordoñez-Pacheco, 2025).

The statistical treatment of the collected data was conducted using descriptive statistics to establish frequencies and medians, and inferential statistics for hypothesis analysis, utilizing Spearman's correlation coefficient. All processing was carried out using Excel and SPSS version 24.

The validity of the instruments was ensured through expert judgment, and reliability was confirmed with high Cronbach's Alpha coefficients (0.971 and 0.973). The questionnaires, containing 12 and 11 items for the respective variables, demonstrated coherence and consistency in measuring the dimensions under study.

Results and discussion

Descriptive analysis

Table 1

Levels of virtual education and student satisfaction at Universidad Peruana Unión, Lima - 2024

Variables		N	%
Virtual education	Low	0	0.0%
	Medium	23	8.3%
	High	254	91.7%
Student satisfaction	Low	116	41.9%
	Medium	101	36.5%
	High	60	21.7%
	Total	277	100.0%

Table 1 presents the levels of the analyzed variables. It is observed that 91.7% of participants exhibit a high level of virtual education, while 8.3% report a medium level. In terms of student satisfaction, 41.9% express a low level, 36.5% a medium level, and 21.7% a high level.

Hypothesis testing

Table 3
Normality test of variables and dimensions

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Virtual education	,188	142	,000	,864	142	,000
Virtual learning resources	,273	142	,000	,826	142	,000
Virtual support	,186	142	,000	,874	142	,000
Virtual collaboration	,194	142	,000	,891	142	,000
Competencies	,253	142	,000	,837	142	,000
Student satisfaction	,132	142	,000	,897	142	,000
Quality of the institution	,132	142	,000	,904	142	,000
Student expectations	,226	142	,000	,885	142	,000
Virtual teachers	,269	142	,000	,824	142	,000

Table 3 shows that, according to the Kolmogorov-Smirnov test, all variables present p-values less than 5%, indicating that they do not follow a normal distribution. Consequently, it is concluded that the data are non-parametric, which is why Spearman's Rho coefficient was used for the correlational analysis.

Table 4
Correlation between virtual education and student satisfaction at a private university in Lima, 2024.

			Virtual education	Student satisfaction
Spearman's Rho	Virtual education	Correlation coefficient	1,000	,935**
		Sig. (two-tailed)	.	,000
		N	142	142
	Student satisfaction	Correlation coefficient	,935**	1,000
		Sig. (two-tailed)	,000	.
		N	142	142

Table 4 demonstrates a strongly positive correlation (ρ = 0.935) between the variables, a relationship that is statistically significant (p = 0.000 < 0.01). This indicates that higher quality in virtual education is associated with greater student satisfaction.

Table 5

Correlation between virtual learning resources and student satisfaction at a private university in Lima, 2024.

			Virtual learning resources	Student satisfaction
Spearman's Rho	Virtual learning resources	Correlation coefficient	1,000	,778**
		Sig. (two-tailed)	.	,000
		N	142	142
	Student satisfaction	Correlation coefficient	,778**	1,000
		Sig. (two-tailed)	,000	.
		N	142	142

Table 5 shows a strong (ρ = 0.778) and relevant correlation between the variables. This result suggests that higher quality and access to resources are associated with greater satisfaction reported by students.

Table 6

Correlation between virtual support and student satisfaction at a private university in Lima, 2024.

			Virtual support	Student satisfaction
Spearman's Rho	Virtual support	Correlation coefficient	1,000	,876**
		Sig. (two-tailed)	.	,000
		N	142	142
	Student satisfaction	Correlation coefficient	,876**	1,000
		Sig. (two-tailed)	,000	.
		N	142	142

The analysis in Table 6 reveals a strong and statistically significant correlation (ρ = 0.876, p < 0.01, N = 142). This indicates that greater virtual support is associated with higher student satisfaction.

Table 7

Correlation between virtual collaboration and student satisfaction at a private university in Lima, 2024.

	Virtual collaboration	Student satisfaction

Spearman's Rho	Virtual collaboration	Correlation coefficient	1,000	,873**
		Sig. (two-tailed)	.	,000
		N	142	142
	Student satisfaction	Correlation coefficient	,873**	1,000
		Sig. (two-tailed)	,000	.
		N	142	142

Table 7 presents a highly consistent and relevant correlation (ρ = 0.873, p = 0.000) between the variables, indicating that greater virtual collaboration positively influences students' educational experience.

Table 8
Correlation between competencies and student satisfaction at a private university in Lima, 2024.

			Competencies	Student satisfaction
Spearman's Rho	Competencies	Correlation coefficient	1,000	,828**
		Sig. (two-tailed)	.	,000
		N	142	142
	Student satisfaction	Correlation coefficient	,828**	1,000
		Sig. (two-tailed)	,000	.
		N	142	142

Finally, the Spearman analysis reflects a very strong and significant correlation (ρ = 0.828, p = 0.000) between these variables, indicating that the pedagogical development of teachers significantly influences students' satisfaction.

Conclusions

It was determined that there is a very strong positive correlation between the research variables (ρ = 0.935), confirming the general objective of the study: there is a significant relationship between virtual education and student satisfaction.

Regarding the first specific objective, a high correlation (ρ = 0.778) was found between the variables, demonstrating that the use of appropriate materials directly influences a more satisfying educational experience.

In relation to the second specific objective, virtual support showed a strong correlation (ρ = 0.876), indicating that continuous support from instructors positively impacts student satisfaction.

Concerning the third specific objective, virtual collaboration revealed a significant relationship (ρ = 0.873), indicating that joint and participatory work enhances students' perception of their educational experience.

With respect to the fourth specific objective, the relationship between teaching competencies and satisfaction was also strong (ρ = 0.828), highlighting that a proper digital and pedagogical mastery by faculty directly contributes to a successful and valued educational experience for students.

In conclusion, it is suggested to adopt a comprehensive approach to the development of virtual education, which includes the use of quality resources, instructor support, and active student collaboration. Furthermore,

ongoing training in digital and pedagogical competencies is a key factor for significantly improving the experience and satisfaction of students in virtual learning environments.

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