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ARTICLE

Audiovisual Communication in University Students' Perceptions of Scientific Dissemination

La Comunicación Audiovisual en la Percepción de la Divulgación Científica de Estudiantes Universitarios

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ABSTRACT

Videos constituted a relevant tool for the dissemination of academic and scientific material, especially in digital contexts, where students consume information mainly through audiovisual formats. The objective of the study was to analyze which elements or factors of audiovisual communication predict the perception of science communication among Social Sciences students at the National University of Tumbes during the 2025 period. The research followed the positivist paradigm, with a hypothetico-deductive method and quantitative approach, under a non-experimental, correlational-explanatory, cross-sectional design. The population consisted of 1,124 students, and the researchers selected a probabilistic sample of 347 participants. They applied two structured questionnaires with a five-option Likert scale, organized by dimensions and validated through expert judgment; the researchers estimated reliability with McDonald's Omega coefficient. Data analysis included descriptive statistics, Kolmogorov-Smirnov normality tests, Spearman's rho correlation, and ordinal logistic regression to identify predictive factors. The results showed that the probability of reaching higher levels of science communication increased when the videos presented a coherent and easy-to-understand message (P10; OR=1.805; p=0.004), relevant content (P11; OR=1.579; p=0.011), integration of text or graphics (P14; OR=1.580; p=0.037), and fluidity in shots and angles (P4; OR=1.435; p=0.042). Likewise, the global correlation between audiovisual communication and science communication showed a positive and significant result (rho=0.194; p=0.001), although with low magnitude. By dimensions, morphology, semantics, and aesthetics showed significant but weak associations, whereas syntax and expression did not reach statistical significance.

KEYWORDS: Audiovisual communication, scientific dissemination, university students, perception.

RESUMEN

Los videos constituyeron una herramienta relevante para la difusión de material académico y científico, especialmente en contextos digitales, donde los estudiantes consumen información principalmente en formatos audiovisuales. El objetivo del estudio fue analizar qué elementos o factores de la comunicación audiovisual predicen la percepción de la divulgación científica en estudiantes de Ciencias Sociales de la Universidad Nacional de Tumbes durante el periodo 2025. La investigación se enmarcó en el paradigma positivista, con método hipotético-deductivo y enfoque cuantitativo, bajo un diseño no experimental de tipo correlacional-explicativo y corte transversal. La población estuvo conformada por 1124 estudiantes y se seleccionó una muestra probabilística de 347 participantes. Se aplicaron dos cuestionarios estructurados con escala Likert de cinco opciones, organizados por dimensiones y validados mediante juicio de expertos; la confiabilidad se estimó a través del coeficiente Omega de McDonald. Los datos se analizaron mediante estadística descriptiva, pruebas de normalidad de Kolmogorov-Smirnov, correlación de rho de Spearman y regresión logística ordinal para identificar factores predictivos. Los resultados evidenciaron que la probabilidad de ubicarse en niveles superiores de divulgación científica aumentó cuando los videos presentaron un mensaje coherente y fácil de comprender (P10; OR=1,805; p=0,004), contenido relevante (P11; OR=1,579; p=0,011), integración de texto o gráficos (P14; OR=1,580; p=0,037) y fluidez de planos y ángulos (P4; OR=1,435; p=0,042). Asimismo, la correlación global entre la comunicación audiovisual y la divulgación científica fue positiva y significativa (rho=0,194; p=0,001), aunque de baja magnitud. Por dimensiones, morfología, semántica y estética presentaron asociaciones significativas, aunque débiles, mientras que sintaxis y expresión no alcanzaron significancia estadística.

PALABRAS CLAVE: Comunicación audiovisual, divulgación científica, estudiantes universitarios, percepción.

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Introduction

Videos constituted a relevant tool for the dissemination of academic and scientific material, especially in digital contexts, where students consume information mainly through audiovisual formats. During the COVID-19 pandemic, the need to counter misinformation became evident, which led scientists and research centers to adopt approaches consistent with current habits of information consumption, such as audiovisual media on social networks (Caraguay et al., 2024). Traditional formats of scientific communication have lost interest and relevance, especially among young people, who prefer audiovisual content on social networks because of its reliability and ease of understanding (Velarde et al., 2024). Youth interest in science relates to the rise of digital platforms such as Facebook, TikTok, and YouTube, which incorporate audiovisual communication and facilitate science communication (Ojeda & García, 2022).

Nevertheless, in Peruvian universities, science communication in audiovisual format faces technical and narrative limitations, such as inappropriate use of shots, deficient editing, and low audio quality, which affect the clarity and effectiveness of the message. At the National University of Tumbes (UNTUMBES), these deficiencies influence the perception of science communication on social networks. To improve this situation, audiovisual production should follow professional sound and visual quality standards, as well as appropriate narrative and aesthetic criteria. In addition, UNTUMBES should create a scientific editorial line on social networks and train university teams in the production and editing of scientific content.

At the international level, Bao et al. (2023) demonstrated that aesthetic deficiencies harm the viewer's experience. Piccolo et al. (2023) concluded that videos without sound may distort the message and affect the perception of truthfulness. Galatsopoulou et al. (2022) showed that videos improve student motivation and engagement in active learning. Rowley and Carter (2019) emphasized that brevity and clarity in videos enhance comprehension, although excessive simplification may reduce the depth of knowledge. In Peru, Lozano and Ocaña (2021) found that 95% of students positively value audiovisual messages, while Veintemilla (2020) indicated that 39% of students perceive videos as high-impact resources and that 85% prefer accessible rather than technical language.

In support of the above, the study posed the following general question: What factors of audiovisual communication predict the perception of Social Sciences students at UNTUMBES regarding science communication in 2025? The study formulated the specific questions as follows: Is there a relationship between audiovisual communication, morphology, syntax and expression, semantics, aesthetics, and science communication in 2025? Therefore, the general objective is to analyze which elements or factors of audiovisual communication predict the perception of science communication among Social Sciences students at the National University of Tumbes in 2025. As specific objectives, the study seeks to establish the relationship between audiovisual communication, morphology, syntax and expression; between semantics and aesthetics; and between science communication.

Methodology

The research followed the epistemological current of positivism. From the perspective of Outhwaite (2015), positivism constitutes a philosophical and methodological orientation that postulates that social reality can undergo objective examination and empirical apprehension through systematic observation and logical-rational inference. In relation to this, the study adopted a quantitative approach. According to Sciberras and Dingli (2023), this approach requires the operationalization and measurement of the phenomenon under study through numerical data to describe, analyze, and contrast it rigorously.

On the other hand, the study had a non-experimental design. According to Hernández et al. (2014), in this design the researcher observes and quantifies the variables in their usual environment, without intervention or control over them, to understand the phenomenon as it occurs spontaneously in its original condition. Likewise, the study had a correlational-explanatory type. According to Sullivan (2021), this type examines the degree and direction of the relationship between two or more variables. Yüce (2024) states that explanatory research seeks to identify mechanisms

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and causes of little-studied phenomena, as well as to establish causal relationships between variables to understand social processes. Finally, the study had a cross-sectional scope. According to Kesmodel (2018), this type of observational study examines information from a population at a single point in time.

In addition, the population, according to Hernández and Mendoza (2018), refers to the universe of people, objects, or events that share one or more characteristics, which allows delimitation and organization into a relatively homogeneous set and provides a reference for data analysis and interpretation. In this research, the population consisted of 1,124 students enrolled in the 2025-II period and affiliated with the Faculty of Social Sciences.

The sample consisted of 347 students, and a probabilistic procedure selected the participants. In the terms of Spolarich (2023), sample selection refers to the procedure through which the researcher chooses a relevant and representative subset of the population to describe it and make inferences about the entire set. Although the analysis of only a fraction proves more practical and efficient than the coverage of the complete universe, it involves a margin of error and certain inaccuracies inherent in any estimation.

The study used the survey as the research technique. The researchers obtained the information directly from the students through the face-to-face administration of structured questionnaires that measured their perceptions of the variables analyzed. In line with this, Hernández et al. (2014) argue that this technique is appropriate when the aim is to collect quantifiable data from a delimited population, without intervention in or manipulation of the variables.

With respect to the research tool, the study used two self-developed structured questionnaires, organized by dimensions and formulated with a five-option Likert scale: Never, Almost never, Sometimes, Almost always, and Always. Expert judgment provided validation, and McDonald's Omega coefficient assessed reliability. Table 1 and Table 2 present the instruments below:

Table 1

Research Instrument – Audiovisual Communication.

RATING SCALE: 3 = ALWAYS 2 = SOMETIMES 1 = NEVER						
Indicator / Items		**1**	**2**	**3**	**4**	**5**
DIMENSION: MORPHOLOGY						
P1	The visual quality of the scientific videos produced by UNTUMBES facilitates the understanding of science					
P2	The sound quality of the scientific videos produced by UNTUMBES facilitates the understanding of the content					
P3	The resolution and quality of the scientific videos produced by UNTUMBES facilitate the understanding of scientific topics					
DIMENSION: SYNTAX AND EXPRESSION						
P4	The shots and angles in the scientific videos produced by UNTUMBES allow a fluid presentation of the content					
P5	The rhythm and continuity of the scientific videos produced by UNTUMBES allow a fluid understanding of the content					
P6	The camera movement in the scientific videos produced by UNTUMBES is appropriate for drawing attention to the topic being explained					
P7	The use of lighting and colors in the scientific videos produced by UNTUMBES draws attention to the topic being presented					
DIMENSION: SEMANTICS						
P8	The idea or central meaning of the content in the scientific videos is clear and easy to understand					
P9	The scientific videos produced by UNTUMBES allow a correct interpretation of the symbolic or subjective aspects of the scientific content presented					

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P10	The message in the scientific videos produced by UNTUMBES is coherent and easy to understand					
P11	The ideas or content presented in the scientific videos produced by UNTUMBES are relevant to their academic learning					
DIMENSION: AESTHETICS						
P12	The use of stylistic resources such as typography, filters, graphics, etc. in the scientific videos produced by UNTUMBES facilitates the understanding of the topic presented					
P13	The creative style in the scientific videos motivates interest in the topic being presented					
P14	The integration of different visual elements such as text or graphics in the scientific videos produced by UNTUMBES improves the understanding of science					
P15	The aesthetics of the scientific videos are attractive and motivate interest in science					

Note. Self-developed instrument (2025).

Table 2

Research Instrument – Science Communication.

RATING SCALE: 3 = ALWAYS 2 = SOMETIMES 1 = NEVER						
Indicator / Items		**1**	**2**	**3**	**4**	**5**
DIMENSION: ACCESSIBILITY						
P1	The scientific contents presented by UNTUMBES are accessible to all students					
P2	The science communication materials produced by UNTUMBES are available in formats that are convenient for viewing					
P3	The scientific contents produced by UNTUMBES are available on the internet					
DIMENSION: COMPREHENSIBILITY						
P4	The language used when communicating science by UNTUMBES is simple and easy to understand					
P5	The scientific content uses examples that facilitate the understanding of the topics presented					
DIMENSION: INTERACTIVITY						
P6	Videos with scientific content are easy to find on platforms such as YouTube, Instagram, or Facebook					
P7	The scientific videos produced by UNTUMBES allow feedback to be received during viewing					
P8	Some option is provided to conduct surveys, votes, or reactions during the viewing of the videos					
DIMENSION: CREDIBILITY						
P9	The information presented in the videos with scientific content produced by UNTUMBES is reliable					
P10	The information presented in the scientific videos of UNTUMBES projects support or scientific evidence					
P11	The scientific videos produced by UNTUMBES are presented by experts in the scientific field					
DIMENSION: IMPACT						
P12	Science communication by UNTUMBES has a positive impact on my learning					
P13	Science communication by UNTUMBES has helped me understand complex concepts					
P14	Science communication by UNTUMBES awakens the desire to learn about other scientific topics					
P15	Science communication by UNTUMBES motivates involvement in scientific activities, such as attending conferences or events					

Note. Self-developed instrument (2025).

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The expert judgment of three specialists in methodology, statistics, and audiovisual production evaluated content validity. Over two months, the experts reviewed each item for clarity, relevance, and coherence with the dimensions; they issued observations and reformulated the statements, order, and response options until they reached consensus. Then, the study synthesized their ratings through Aiken's V and obtained values of 1.00 for each item and for overall validity, as shown in Figure 1 and Figure 2:

Figure 1

Aiken's V for Audiovisual Communication.

Description	E1	E2	E3	Sum	Aiken's V $V = \frac{\Sigma s}{n(c-1)}$	Valid
P1. The visual quality of the scientific videos produced by UNTSUMBES facilitates the understanding of science.	1	1	1	3	1.00	Yes
P2. The sound quality of the scientific videos produced by UNTSUMBES facilitates understanding of the content.	1	1	1	3	1.00	Yes
P3. The resolution and quality of the scientific videos produced by UNTSUMBES facilitate understanding of scientific topics.	1	1	1	3	1.00	Yes
P4. The shots and angles in the scientific videos produced by UNTSUMBES allow a visual presentation of the content.	1	1	1	3	1.00	Yes
P5. The rhythm and continuity of the scientific videos produced by UNTSUMBES allow a fluid understanding of the content.	1	1	1	3	1.00	Yes
P6. The camera movement in the scientific videos produced by UNTSUMBES is adequate to draw attention to the topic being explained.	1	1	1	3	1.00	Yes
P7. The use of lighting and colors in the scientific videos produced by UNTSUMBES draws attention to the topic presented.	1	1	1	3	1.00	Yes
P8. The main idea or central meaning of the content in the scientific videos is clear and easy to understand.	1	1	1	3	1.00	Yes
P9. The scientific videos produced by UNTSUMBES allow a correct interpretation of the symbolic or subjective aspects of the scientific content presented.	1	1	1	3	1.00	Yes
P10. The message of the scientific videos produced by UNTSUMBES is coherent.	1	1	1	3	1.00	Yes
P11. The ideas or content presented in the scientific videos produced by UNTSUMBES are relevant to academic learning.	1	1	1	3	1.00	Yes
P12. The use of aesthetic resources such as typography, filters, graphics, etc., in the scientific videos produced by UNTSUMBES facilitates understanding of the topic presented.	1	1	1	3	1.00	Yes
P13. The creative style in the visual or mixed scientific videos produced by UNTSUMBES improves understanding of science.	1	1	1	3	1.00	Yes
P14. The integration among the different visual elements such as text or graphics in the scientific videos produced by UNTSUMBES improves understanding of science.	1	1	1	3	1.00	Yes
P15. The aesthetics of the scientific videos are attractive and positively influence interest in science.	1	1	1	3	1.00	Yes
OVERALL VALIDITY					1.00	Yes
	Yes	No				
	1	0				

Note. Expert validation (2025).

Figure 2

Aiken's V for Science Communication.

Description	E1	E2	E3	Sum	Aiken's V $V = \Sigma s / n(c-1)$	Valid
P1. The scientific content presented by UNTUMBES is accessible to all students.	1	1	1	3	1.00	Yes
P2. The scientific dissemination materials produced by UNTUMBES are available in formats that are convenient for viewing.	1	1	1	3	1.00	Yes
P3. The scientific content produced by UNTUMBES is available on the internet.	1	1	1	3	1.00	Yes
P4. The language used in UNTUMBES scientific dissemination is simple and easy to understand.	1	1	1	3	1.00	Yes
P5. The scientific content uses examples that facilitate understanding of the topics presented.	1	1	1	3	1.00	Yes
P6. Videos with scientific content are easy to find on platforms such as YouTube, Instagram, and Facebook.	1	1	1	3	1.00	Yes
P7. The scientific videos produced by UNTUMBES allow viewers to receive feedback during viewing.	1	1	1	3	1.00	Yes
P8. An option is provided to conduct surveys, voting, or reactions during video viewing.	1	1	1	3	1.00	Yes
P9. The information presented in videos with scientific content produced by UNTUMBES is reliable.	1	1	1	3	1.00	Yes
P10. The information presented in UNTUMBES scientific videos shows scientific support or evidence.	1	1	1	3	1.00	Yes
P11. The scientific videos produced by UNTUMBES are presented by experts in the scientific field.	1	1	1	3	1.00	Yes
P12. UNTUMBES scientific dissemination has a positive impact on my learning.	1	1	1	3	1.00	Yes
P13. UNTUMBES scientific dissemination has helped me understand complex concepts.	1	1	1	3	1.00	Yes
P14. UNTUMBES scientific dissemination awakens the desire to learn about other scientific topics.	1	1	1	3	1.00	Yes
P15. UNTUMBES scientific dissemination motivates involvement in scientific activities, such as attending conferences or events.	1	1	1	3	1.00	Yes
OVERALL VALIDITY					1.00	Yes
	Yes	No				
	1	0				

Note. Expert validation (2025).

At the end of the validation process, the researchers conducted a pilot test to calculate reliability with McDonald's Omega among 105 students of economic sciences, given that they represent 30% of the sample and share certain formative characteristics within the university setting. According to Hernández et al. (2014), a pilot test consists of the preliminary administration of the instrument to a group with characteristics similar to

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those of the target population, but different from the study sample, to refine it before definitive data collection. Likewise, Hernández et al. (2014) state that reliability refers to the consistency of the results obtained from the items in the pilot test. The results show good coefficients, as Table 3 presents below:

Table 3
Reliability Test – McDonald's Omega.

Reliability statistic / Variable	McDonald's Omega	No. of elements
Audiovisual communication	,933	15
Morphology	.818	3
Syntax and/or Expression	.754	4
Semantics	.847	4
Aesthetics	.756	4
Science communication	,941	15
Accessibility	,750	3
Comprehensibility	,697	2
Interactivity	,762	3
Credibility	,823	3
Impact	,843	4

Note. Data obtained through statistical correlation in SPSS, compiled by the author (2025).

Subsequently, the researchers processed the data with SPSS statistical software. In the first stage, they performed descriptive statistics through frequencies and percentages, with the purpose of identifying the perception levels of the variables audiovisual communication and science communication, as well as their respective dimensions. In the second stage, they evaluated data normality through the Kolmogorov-Smirnov test to determine the most appropriate type of inferential analysis. Since the results showed that the data did not present a normal distribution, the researchers selected nonparametric statistical tests.

Consequently, the researchers used Spearman's rho correlation coefficient to analyze the relationship between audiovisual communication and science communication, as well as between their respective dimensions. This procedure allowed the estimation of the direction and magnitude of the associations between the variables studied. Additionally, to identify the factors of audiovisual communication that predict the perception of science communication, the researchers applied an ordinal logistic regression model, with the levels of science communication as the dependent variable and the audiovisual communication items as predictor variables. This model allowed the estimation of the probability that the dependent variable would reach higher levels based on the different components that the study evaluated in the scientific videos.

Results

In general terms, the results showed that audiovisual communication has a positive and significant relationship with science communication as perceived by the students, although with low magnitude. Likewise, the predictive analysis showed that certain audiovisual components, particularly message coherence, content relevance, integration of graphic resources, and fluidity in shots and angles, increase the probability that students perceive science communication at higher levels. The researchers performed the statistical analyses with a sample of 347 students from the Faculty of Social Sciences of the National University of Tumbes.

This section presents the study results at two levels of analysis: descriptive and inferential. First, it presents the descriptive findings from the distribution of frequencies and percentages of the variables audiovisual communication and science communication, as well as their respective dimensions, to identify students' perception levels. Subsequently, it presents the results of the inferential analysis, including normality tests, Spearman's rho correlation to estimate the relationship between the variables and their dimensions, and ordinal logistic regression to identify the factors of audiovisual communication that predict science communication levels. These analyses examined both the association between the variables and the specific contribution of the different audiovisual components to students' perception of science communication.

Descriptive Results

The descriptive results characterized students' perception levels regarding the variables of audiovisual communication and science communication, as well as their dimensions. To this end, the researchers analyzed the frequencies and percentages of the responses obtained through the questionnaires applied to the study sample, which

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allowed the identification of the distribution of low, regular, and high levels in each variable. This initial analysis offered a general view of data behavior and facilitated the understanding of the predominant trends in student perceptions before the inferential analysis of the relationships between the variables.

Table 4

Cross-Frequency of Audiovisual Communication and Science Communication.

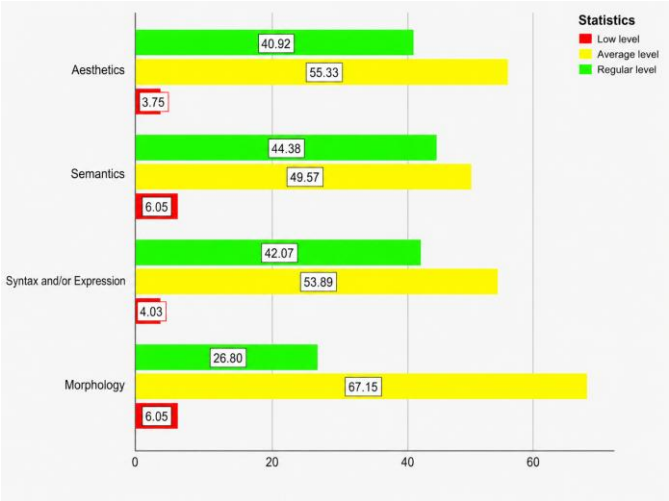
Audiovisual communication	Science communication: Low level	Science communication: Regular level	Science communication: High level	Total
Low level (% of total)	0.3%	1.2%	0.6%	2.0%
Regular level (% of total)	4.9%	32.9%	22.5%	60.2%
High level (% of total)	1.4%	15.6%	20.7%	37.8%
Total (% of total)	6.6%	49.6%	43.8%	100.0%

Note. Survey data analyzed in SPSS (2025).

Table 4 shows that, when students perceived audiovisual communication at more favorable levels, science communication also tended to reach higher ranges. Audiovisual communication appeared mostly at regular (60.2%), high (37.8%), and low (2%) levels, while science communication showed a main distribution across regular (49.6%), high (43.8%), and low (6.6%) levels. In the joint distribution, the regular-regular (32.9%) and high-high (20.7%) combinations concentrated the greatest weight, followed by regular-high (22.5%) and high-regular (15.6%).

Figure 3

Levels of the Dimensions of the Audiovisual Communication Variable.



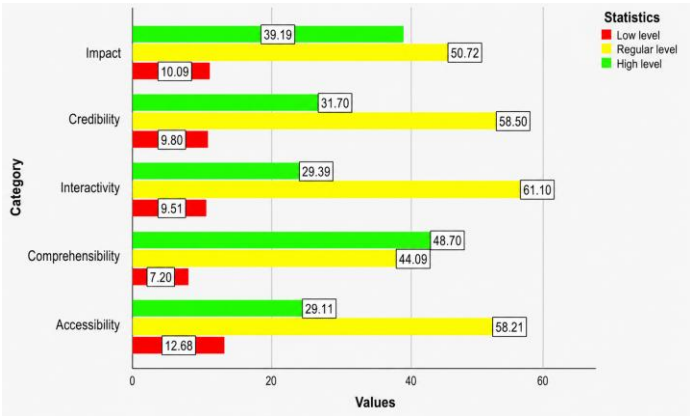
Note. Survey data analyzed in SPSS (2025).

Figure 3 shows the results for the dimensions of audiovisual communication. The morphology dimension evaluated the technical quality of visual and sound elements. In this dimension, 67.15% of students placed it at a regular level, 26.80% at a high level, and 6.05% at a low level. The syntax and expression dimension assessed shot composition, movement, rhythm, lighting, and colors; 53.89% of students placed it at a regular level, 42.07% at a high level, and only 4.03% at a low level.

The semantics dimension focused on message clarity and coherence. In this dimension, 49.57% of students placed it at a regular level, 44.38% at a high level, and 6.05% at a low level. Finally, the aesthetics dimension evaluated stylistic resources and visual creativity; 55.33% of students placed it at a regular level, 40.92% at a high level, and 3.75% at a low level.

Figure 4

Levels of the Dimensions of the Science Communication Variable.



Note. Survey data analyzed in SPSS (2025).

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Figure 4 shows the results for the dimensions of science communication.. students placed accessibility at a regular level (58.21%), a high level (29.11%), and a low level (12.68%). In comprehensibility, 48.70% of students rated the content at a high level, 44.09% at a regular level, and 7.20% at a low level. In the interactivity dimension, 61.10% of students identified a regular level of participation and feedback in the content, 29.39% rated it as high, and 9.51% as low. For credibility, 58.50% of students valued the scientific videos as moderately reliable, 31.70% considered them highly reliable, and 9.80% perceived them as poorly reliable. Finally, in the impact dimension, 50.72% of students identified a medium impact on their academic development, motivation, and interest in research, while 39.19% rated it as high and 10.09% as low.

Inferential Results

The inferential results allowed the examination of the statistical relationship between audiovisual communication and science communication, as well as the identification of the specific factors that influence students' perception of this relationship. Initially, the researchers evaluated data distribution through normality tests to determine the most appropriate type of statistical analysis. Subsequently, they applied Spearman's Rho correlation coefficient to estimate the magnitude and direction of the association between the variables and their dimensions. Finally, they used an ordinal logistic regression model to identify the components of audiovisual communication that predict the probability that students perceive science communication at higher levels. These analyses allowed an understanding of both the existence of significant relationships between the variables and the specific contribution of certain audiovisual elements to students' perception of science communication (see Table 5).

Table 5
Normality Tests.

Variable/Dimension	Kolmogorov-Smirnov	N	Sig.
Morphology	0.142	347	0.001
Syntax and/or expression	0.173	347	0.001
Semantics	0.120	347	0.001
Aesthetics	0.141	347	0.001
Audiovisual communication	0.148	347	0.001
Accessibility	0.149	347	0.001
Comprehensibility	0.158	347	0.001
Interactivity	0.154	347	0.001
Credibility	0.151	347	0.001
Impact	0.142	347	0.001
Science communication	0.093	347	0.001

Note. Data analyzed in SPSS (2025).

Regarding the normality test applied to the dimensions and variables of the study, all cases obtained a significance value of p = 0.001, which indicates that the scores did not fit a normal distribution. Consequently, the researchers used nonparametric techniques for the inferential analysis, specifically Spearman's Rho to estimate associations and ordinal logistic regression to model the dependent variable across ordered levels (see Table 6).

Table 6
Model Fitting Information – Goodness of Fit.

Model / Statistic	-2 Log Likelihood	Chi-square	df	Sig.
Intercept only	515.840			
Final	435.291	80.549	15	.000
Goodness of fit: Pearson		622.650	291	.000
Goodness of fit: Deviance		398.100	291	.000

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Pseudo R-squared: Cox and Snell	0.207
Pseudo R-squared: Nagelkerke	0.249
Pseudo R-squared: McFadden	0.131

Note. Data analyzed in SPSS (2025).

In global terms, the final model showed significant improvement compared with the intercept-only model, with a reduction in the -2 log-likelihood from 515.840 to 435.291 (χ^2 = 80.549; df = 15; p < 0.001). This result shows that the set of predictors contributed relevant information to the model. Nevertheless, the goodness-of-fit statistics showed discrepancies between observed and estimated values (Pearson = 622.650; Deviance = 398.100; df = 291; p < 0.001); therefore, the researchers should interpret the model with caution. Finally, the pseudo-coefficients of determination (Cox & Snell = 0.207; Nagelkerke = 0.249; McFadden = 0.131) indicate a limited to moderate explanatory capacity. The researchers applied ordinal logistic regression with the levels of science communication (low, regular, and high) as the dependent variable and the items of audiovisual communication as predictor variables.

Table 7

Ordinal Logistic Regression – Audiovisual Communication Items in Science Communication.

Parameter	B	Std. Error	Wald CI Lower	Wald CI Upper	Wald χ^2	df	Sig.	Exp(B)	Exp(B) CI Lower	Exp(B) CI Upper
[Science communication=Never]	,728	,5685	-,386	1,843	1,642	1	,200	2,072	,680	6,313
[Science communication=Sometimes]	4,119	,6016	2,939	5,298	46,866	1	,000	61,477	18,906	199,900
P1	-,137	,1520	-,435	,161	,815	1	,367	,872	,647	1,174
P2	-,079	,1836	-,439	,281	,184	1	,668	,924	,645	1,324
P3	-,370	,1849	-,732	-,007	4,002	1	,045	,691	,481	,993
P4	,361	,1774	,013	,709	4,145	1	,042	1,435	1,014	2,031
P5	,000	,1795	-,352	,352	,000	1	,999	1,000	,704	1,422
P6	,111	,1278	-,139	,361	,755	1	,385	1,117	,870	1,435
P7	-,322	,1856	-,686	,041	3,018	1	,082	,724	,504	1,042
P8	-,173	,2153	-,595	,249	,643	1	,423	,841	,552	1,283
P9	,254	,1856	-,110	,617	1,868	1	,172	1,289	,896	1,854
P10	,591	,2040	,191	,990	8,382	1	,004	1,805	1,210	2,692
P11	,457	,1797	,105	,809	6,460	1	,011	1,579	1,110	2,245
P12	-,094	,1488	-,386	,197	,402	1	,526	,910	,680	1,218
P13	-,149	,1512	-,445	,148	,968	1	,325	,862	,641	1,159
P14	,457	,2193	,028	,887	4,350	1	,037	1,580	1,028	2,428
P15	,083	,1553	-,222	,387	,283	1	,595	1,086	,801	1,472
(Scale)	1a									

Note. Significant items: P4 = Fluid shots and angles; P10 = The coherent and easy-to-understand message; P11 = The ideas or content are relevant; and P14 = The integration of text or graphics.

In general terms, most items did not reach statistical significance; however, four components showed a relevant and consistent contribution. Specifically, videos with a coherent and easy-to-understand message, relevant content, effective integration of text or graphics, and fluid shots and angles increased the probability that students would value science communication in higher categories.

Table 8

Correlation of Audiovisual Communication and Its Dimensions with Science Communication.

Spearman's Rho	Science communication: Correlation coefficient	Sig.	N
Audiovisual communication	,194**	,001	347
Morphology	,106*	,049	347

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Syntax and expression	,105	,051	347
Semantics	,135*	,012	347
Aesthetics	,143**	,008	347

Note. Data obtained through statistical correlation in SPSS (2025).

Table 8, the analysis showed a positive and statistically significant relationship between audiovisual communication and science communication (Rho = 0.194; p = 0.001). Nevertheless, the effect size remains low, so the finding suggests a real association, although with limited practical relevance. Better evaluations of audiovisual communication tend to correspond to slightly higher evaluations of science communication, which suggests the possible influence of additional variables not included in the model.

When analyzed by dimensions, morphology, semantics, and aesthetics showed significant relationships, all with low magnitudes. By contrast, syntax and expression did not reach statistical significance. In summary, the results indicate that message clarity and aesthetic resources show greater consistency in their association with science communication, although the observed effect remains reduced.

Discussion

In response to the research question, the results indicate that some components of audiovisual communication predict the perception of science communication; however, the effect concentrates on specific factors. In the ordinal model (Table 7), the probabilities of reaching higher levels of science communication increase significantly when students perceive a coherent and easy-to-understand message (P10; OR = 1.805; p = 0.004), when they consider the content relevant (P11; OR = 1.579; p = 0.011), when text or graphics support the explanation (P14; OR = 1.580; p = 0.037), and when the videos present fluid shots and angles (P4; OR = 1.435; p = 0.042). Therefore, the perception of science communication improves above all when the video remains understandable, provides value, and guides comprehension through visual resources.

This confirms Piccolo et al. (2023), who highlighted how the integration of auditory elements influences public perception and trust in science communication. Likewise, Galatsopoulou et al. (2022) concluded that technical factors, such as audio and video quality, have importance. Finally, Rowley and Carter (2019) underscored the importance of audiovisual quality for effective communication, especially with non-specialized audiences, and emphasized that visual and sound clarity plays a decisive role in the transmission of complex scientific messages.

In the syntax and expression dimension, which includes shots, angles, narrative rhythm, scene continuity, and camera movement in the scientific videos produced by UNTUMBES, the results did not show a statistically significant relationship with the perception of science communication. This finding suggests that, although the technical aspects of audiovisual composition may contribute to the narrative quality of the content, their influence on student perception may remain secondary compared with factors linked to message clarity and content relevance. However, studies such as Lozano and Ocaña (2021) indicate that factors such as visual composition, shots, and angles may facilitate the interpretation of audiovisual messages in educational contexts, which suggests that their impact may depend on the context of use and the type of scientific content presented.

In the semantics dimension, associated with the clarity, coherence, and meaning of the scientific message in the videos, the results showed a significant relationship with the perception of science communication. This result reinforces the idea that content comprehension depends largely on the way the message receives structure and reaches the public. In this sense, the findings coincide with Rowley and Carter (2019), who emphasize that clarity, brevity, and discourse organization represent fundamental elements to capture the attention of non-specialized audiences. Similarly, Veintemilla (2020) corroborated that well-structured audiovisual resources favor the understanding of scientific concepts, especially when they use accessible and contextualized language.

In the aesthetics dimension, linked to visual resources, creativity, and visual attractiveness of the content, the results showed a significant association

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with the perception of science communication, although with low magnitude. This finding suggests that aesthetic aspects may help generate greater interest and motivation toward scientific content, although they do not constitute the only determining factor in the assessment of science communication. These results relate to Bao et al. (2023), who warn that, although many scientific videos contain valuable information, they often lack aesthetic appeal, which may affect the viewer's experience. In the UNTUMBES context, students evaluated audiovisual aesthetics at predominantly medium levels, which suggests opportunities to improve the audiovisual production of scientific content for university audiences.

Overall, the results showed positive and statistically significant associations between the variables and the dimensions; however, the effect sizes remained low, so these relationships represent real links with limited practical scope. By contrast, syntax and expression did not reach statistical significance; therefore, the correlational analysis does not support the attribution of a global impact on the perception of science communication to this dimension.

As limitations, the study used a cross-sectional design; therefore, the results should reflect associations and not causal evidence. In addition, the information came from self-report questionnaires, which may introduce biases derived from students' subjective perception. The sample also came from a single faculty and a specific academic period, which restricts the scope of generalization. Finally, given that the observed relationships showed low magnitude, other variables may intervene, such as interest in science, source credibility, or digital consumption habits, which also influence the assessment of science communication.

As future directions, the study should expand to other faculties and university contexts and incorporate complementary variables that allow a more precise explanation of student perception. Likewise, future research should implement longitudinal designs or interventions that evaluate changes in perception after concrete improvements in message clarity, visual resources, and technical quality. Lastly, a qualitative component, such as interviews or focus groups, would allow deeper understanding of how students construct their judgment about science communication and which audiovisual elements they consider most decisive.

Conclusions

The study shows the importance of audiovisual communication as a relevant factor in the perception of science communication among Social Sciences students at the National University of Tumbes. The results show a positive relationship between both variables, although with low magnitude, which indicates that the quality of audiovisual resources may contribute to better comprehension and valuation of scientific content. In particular, message coherence, content relevance, integration of texts or graphics, and fluidity in shots and angles favored students' perception of science communication at higher levels.

From a prospective standpoint, the findings suggest that stronger audiovisual resources in science communication may positively influence the way students access, understand, and value scientific knowledge. In this sense, improvements in content accessibility, interactivity, and aesthetic creativity could favor more meaningful learning processes and stimulate student interest in science. Similarly, these results provide empirical evidence that may guide the design of institutional strategies for the production and dissemination of scientific content in university digital environments.

Finally, future research should deepen the study of audiovisual communication in educational contexts through longitudinal or experimental methodological designs that allow the analysis of changes in student perception over time. Future studies should also incorporate additional variables, such as interest in science, digital consumption habits, and source credibility, to understand more comprehensively the factors that influence science communication. Likewise, scientific and educational institutions should strengthen audiovisual production through narrative, visual, and sound quality standards that favor more effective and accessible science communication for university audiences.

Conflicts of Interest

The authors declare that there are no conflicts of interest related to the conduct of this research or to the interpretation and publication of its results.

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Ethics Statement

The research was developed in accordance with the ethical principles of scientific research and international standards for studies involving human participants. Student participation was voluntary, and anonymity and confidentiality of the information provided through the applied questionnaires were guaranteed. The data collected were used exclusively for academic and scientific purposes, avoiding the identification of participants at any stage of the research and publication process.

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