https://doi.org/10.23925/2176-2724.2021v33i3p557-570

Auditory-perceptual effects of an oral communication training on university radio broadcasters

Efeitos perceptivo-auditivos de um treinamento de comunicação oral em locutores de uma rádio universitária

Efectos auditivo-perceptivos de un entrenamiento de comunicación oral en locutores de radio universitários

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Abstract

Introduction: students of communication courses see on university radio stations the opportunity to develop the skills needed for the job market. **Objective:** to describe the auditory-perceptual effects of an oral communication training on university radio announcers. **Method:** the Expressiveness Development Program for Oral Communication was applied to eight speakers. There were eight meetings with two hours each. In the first and last meeting, the material for auditory-perceptual evaluation was collected in which the participants read an informative text. The samples were randomized and dichotomized in Reading A and Reading B. Two speakers had their readings duplicated for the analysis of internal reliability. Three speech therapists performed analysis of this material without knowing the period to which they belonged. Only the judgment of the one that showed the highest internal coefficient was considered. **Results:** of the eight pairs of readings evaluated, six were considered different after training. Of these six different pairs, four were better after the intervention. The association of voice, speech and interpretation was pointed out as the reason for choosing three of these readings, the most evident change being diction. The values of the notes of the readings after the training showed to be superior. Voices with slight deviation had a slight reduction. The vocal frequency remained inadequate, unlike the other vocal resources that showed a slight improvement: intensity, speech rate, pauses, modulation and emphasis.

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DJB: conception and design of the study, data collection and analysis, writing of the final manuscript.
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Received: 08/08/2020
Accepted: 27/01/2021

Conclusion: the reading notes, the vocal quality and some vocal resources, except for the frequency of speech, showed a slight evolution at the end of the training.

Keywords: Communication; Speech, Language and Hearing Sciences; Radio; Voice training; Universities.

Resumo

Introdução: os estudantes dos cursos de comunicação veem nas rádios universitárias a oportunidade do desenvolvimento das competências necessárias para o mercado de trabalho. **Objetivo:** descrever os efeitos perceptivo-auditivos de um treinamento de comunicação oral em locutores de uma rádio universitária. **Método:** aplicou-se o Programa de Desenvolvimento da Expressividade para Comunicação Oral em oito locutores. Ocorreram oito encontros de duas horas, cada. Coletou-se no primeiro e último encontro, o material para avaliação perceptivo-auditiva em que os participantes liam um texto informativo. As amostras foram aleatorizadas e dicotomizadas em Leitura A e Leitura B. Dois locutores tiveram as suas leituras duplicadas para análise da confiabilidade interna. Três fonoaudiólogas realizaram análise deste material sem conhecer o período ao qual elas pertenciam. Considerou-se apenas o julgamento daquela que mostrou maior coeficiência interna. **Resultados:** dos oito pares de leituras avaliados, seis foram considerados diferentes após o treinamento. Desses seis pares diferentes, quatro foram melhores após a intervenção. A associação da voz, fala e interpretação apontou-se como razão da escolha em três dessas leituras sendo a mudança mais evidente, a dicção. Os valores das notas das leituras após o treinamento mostraram-se superiores. As vozes com desvio leve tiveram uma discreta redução. A frequência vocal permaneceu inadequada, diferente dos demais recursos vocais que mostraram singela melhora: intensidade, velocidade de fala, pausas, modulação e ênfases. **Conclusão:** as notas das leituras, a qualidade vocal e alguns recursos vocais, exceto a frequência da fala, mostraram discreta evolução ao final do treinamento.

Palavras-chave: Comunicação; Fonoaudiologia; Rádio; Treinamento da voz; Universidades.

Resumen

Introducción: los estudiantes de los cursos de comunicación ven en las radios universitarias la oportunidad de desarrollar las habilidades necesarias para el mercado laboral. **Objetivo:** describir los efectos auditivo-perceptuales de una formación en comunicación oral en locutores de radio universitarios. **Método:** se aplicó el Programa de Desarrollo de la Expresividad para la Comunicación Oral a ocho hablantes. Hubo ocho reuniones de dos horas cada una. En el primer y último encuentro se recogió el material para la evaluación auditivo-perceptual en el que los participantes leyeron un texto informativo. Las muestras fueron aleatorizadas y dicotomizadas en Lectura A y Lectura B. Se duplicaron las lecturas de dos hablantes para el análisis de confiabilidad interna. Tres logopedas realizaron análisis de este material sin conocer el período al que pertenecían. Solo se consideró el juicio del que presentó mayor coeficiente interno. **Resultados:** de los ocho pares de lecturas evaluadas, seis se consideraron diferentes después del entrenamiento. De estos seis pares diferentes, cuatro fueron mejores después de la intervención. La asociación de voz, habla e interpretación fue señalada como la razón para elegir tres de estas lecturas, siendo el cambio más evidente la dicción. Los valores de las notas de las lecturas posteriores al entrenamiento mostraron ser superiores. Las voces con ligera desviación tuvieron una ligera reducción. La frecuencia vocal siguió siendo inadecuada, a diferencia del resto de recursos vocales que mostraron una leve mejoría: intensidad, velocidad del habla, pausas, modulación y énfasis. **Conclusión:** las notas de lectura, la calidad vocal y algunos recursos vocales, a excepción de la frecuencia del habla, mostraron una ligera evolución al final del entrenamiento.

Palabras clave: Comunicación; Fonoaudiología; Radio; Entrenamiento de la voz; Universidades.

Introduction

University radio stations first appeared in the last century in Argentina and in the United States, and their numbers began to increase in the early 2000s in countries such as Italy and Spain[1]. They have peculiar characteristics different from other radiophonic styles:

- They specifically target academic communities.
- They provide services to higher-educational institutions.
- They are committed to the dissemination of technical, scientific, and cultural knowledge;
- They use language consonant with their largest audience, the young.
- They operate exclusively during business hours.
- They are normally constituted by scholarship students and volunteers coming from the courses of journalism, social communication, audiovisual production, advertising, and public relations; and
- They transmit via the web through podcasts and streaming services due to difficulties of funding[2-4].

It is not easy to comprehend how these radio stations function because the scientific research on this subject in the past had not been abundant. However, this situation changed in 2011, following the implementation of the Association of University Radio (ARU) in Spain, which aimed to create institutional synergy and make the practices of these radio stations more homogeneous[1,3]. Since then, there has been an expansion in the number of scientific publications in Spain – something that has not occurred in Brazil. According to Kischinhevsky, Mustafa, Matos and Hang (2018)[5], there is a great gap in scientific knowledge regarding university radio stations in Brazil, and the few publications on this topic in Brazil have been restricted to case studies and experience reports, with a focus on the radio stations of the Universidade Federal do Ceará and the Universidade Federal da Paraíba in the last two decades, consequently hindering the expansion of knowledge in this area. Although university radio stations are typically distributed through AM, FM, and web radio platforms, many other radio stations do not officially disclose their activities, thus preventing a mapping of broadcasting conduct.

Students of communication courses – future voice professionals – see in university radios the opportunity to develop skills that are valued by the labor market. In particular, there is a demand for versatility from radio announcers. These individuals are expected to be able to interweave between the roles of announcer, programmer, editor, director, producer, reporter, sound designer, and musician, but the greatest focus demanded of these individuals is on the part of speech and content creation than on the technical aspects of their work[2, 3,4,6].

In a study conducted by a group of speech therapists in Australia, instructors and employers of conventional radio stations reported on the relevant characteristics they sought when hiring speakers. In addition to multifunctionality in radio, the following characteristics were mentioned: vocal flexibility for the station and programming and being healthy, clear, natural, and expressive[7]. Preparing for such communicative demands is therefore an inherent condition for such professionals.

Training programs focused on the development of communicative skills are typically moderated by speech therapists, with specialists in the area of the human voice usually being preferred. In these programs, activities that are conducted usually involve expressive exercises using chained speech, simulations associated with reading texts using different emotions, and explanations about vocal health. In these programs, audiovisual records are also an important resource for the development of self-perception and awareness of participants. Interestingly, these programs tend to be carried out in small groups, as they foster interaction between speakers and interlocutors in several communicative contexts, thereby stimulating the communicator's active attitude and promoting moments in which experiences and knowledge are exchanged[8].

While a literature review showed that the Brazilian scientific production on speech therapy activities in university radio stations is scarce[9], there have been other publications that described speech therapy work in the communication of university students in general[11], with a focus mainly on students of media and journalism, audiovisual production, and radio[12-14]. In this context, the present study aims to describe the perceptual-auditory effects of oral communication training on university radio broadcasters.

Methods

This study was conducted in accordance with the guidelines of the National Health Council (CNS) and commenced following approval by the relevant ethics and research committee under Opinion No. 2,780,453 of CAAE Protocol 87624618.0.0000.0041 and after the director of the radio station that participated in this study consented. All the individuals who participated in this study agreed to their participation by signing informed consent forms.

This is an intervention study that involved the same group of participants before and after testing.

Individuals were invited to participate in this study at a meeting of the Nucleus of Experiments in Radio Content group of the institution where the study was performed. Initially, the study sample was composed of nine participants. One participant later withdrew from the study, leaving us with eight speakers.

The following criteria were used as our inclusion criteria for the sample: an academic and active in the university radio voice-over corps. The exclusion criteria adopted were as follows: having cognitive impairment or difficulty in understanding and performing the evaluations and exercises requested, performing communicative or vocal training concomitant to the study period, and did not participate in all stages of the research.

The Expressiveness Development Program for Oral Communication was carried out between March and April 2018. This training program was devised based on a mapping of speech therapy practices connected with verbal expressiveness that had been carried out by Borrego and Behlau (2018)[8]. This program aims to improve oral communication, being based on a context that widely covers the interaction between interlocutors, vocal psychodynamics, form, content, sound, and sense. In this program, there were moments of reading aloud and speech practice that involve different emotions in addition, audiovisual records for the development of verbal expressiveness perception and strategies for self-perception in oral communication and vocal health were shown (Chart 1)[15].

The training program involved eight two-hour meetings, with each session moderated by two members of the research team. The moderations took place in an air-conditioned classroom on the campus where the radio station was installed. All the meetings were arranged in advance between the moderators and the participants, and it was decided that the afternoon shift would be the most optimal period to hold these meetings.

At the first meeting, the training bases were presented, and the assessment instruments applied by the researchers. For the second to seventh meetings, the research operation was divided into three study blocks that involved the following processes:

- Part I – Dialogue and auditory stimulation for developing communicative perception.
- Part II – Application of exercises and strategies for vocal preparation; and
- Part III – Application of exercises and speech strategies linked with the reading of texts (brief and short) for developing oral expressiveness.

The duration of these study blocks varied according to their themes and the proposed activities that would be carried out during these blocks (Chart 1). In the last meeting, in addition to the resumption of activities connected with the main topics of the training program, the same assessment instruments used in the first meeting were administered again.

Chart 1. Description of the Expressiveness Development Program for Oral Communication applied in the study.

Meeting 1: Opening – Basis of the Program (2 hours)	
Part I	Presentation of vocal training program and researchers
	Delivery of informed consent forms
	Application of assessment protocols
Part II	Individual voice recordings
Homework	Self-perception of oral communication and other forms of communication
Meeting 2: Breathing (2 hours)	
Part I (40 minutes)	Participants were scored from 0 to 10 for their involvement in the homework
	Dialogical exposition: presentation regarding the basic mechanisms of voice production (e.g., the notions of anatomy and physiology of vocal production) and basic principles of interpersonal communication
Part II (20 minutes)	Discussion regarding punctuation and breathing—breathing pauses according to the logic of the text—with an example of a sentence with different meanings according to the punctuation employed
	Cervical movements and rotation of shoulders technique
	Wide movements of the costal-diaphragmatic region during sequences of deep inspiration and exhalation
Part III (20 minutes)	Punctuation (e.g., commas and periods) exercises using printed texts without graphic signs. Annotations had to be made according to the logic of the text, noting the difference in the length of the breaks in the case of commas and periods
	Reading texts aloud with brief individual feedback
Part IV (40 minutes)	Video recording and individual reading aloud of the informative text, "Brazil, a country with a partially free press," for a further analysis of the participants
Homework	Performing exercises and reading text in aloud proposed at the meeting
	Self-perception of oral communication and other forms of communication
	Observation of one's breath and its relation to the content of what is being conveyed
Meeting 3: Vocal warm-up (2 hours)	
Part I (60 minutes)	Participants were scored from 0 to 10 for their involvement in the homework
	Dialogical exhibition: presentation of slides regarding vocal health and aspects related to the impressions transmitted by different vocal resources
Part II (30 minutes)	Reading out of informational text
	Strategy to guide participants in the global understanding of a provided text through questions to identify the structure of the text and infer the author's intention
	Reading aloud the same text and comparing readings before and after understanding the text
	Cervical movements and rotation of shoulders technique
	Wide movements of the structures of the costo-diaphragmatic region during sequences of deep inhalation and exhalation
	Vibrant sound technique in sustained, modulated, and musical scales
	Yawn-sigh technique
	Glottic firmness technique
	Nasal sounds technique associated with the mastication technique
Part III (30 minutes)	Reading aloud the same informative text and analyzing situations
	First reading, without discussion of the text
	Second reading, after discussion and understanding of the text
	Third reading after understanding the text and post-reading
	Comparison between readings and brief individual feedback
	Reading aloud another informative text with brief individual feedback, punctuating parameters such as frequency, intensity, speech articulation, and resonance, in addition to its relationship with the text content
Homework	Performing exercises and reading text in aloud proposed at the meeting
	Self-perception of oral communication and other forms of communication
	Observation of the frequency and intensity of one's voice, speech articulation, and resonance, in addition to the relationship with the content of what being conveyed

Meeting 4: Articulation of speech sounds (2 hours)	
Part I (50 minutes)	Participants were scored from 0 to 10 for their involvement in the homework and for their oral communication during the week
	Video presentation to show examples of vocal psychodynamics, a topic already discussed in the previous meeting, in which the impressions transmitted by the vocal resources were discussed
	Dialogue exhibition: presentation of slides with audio and video examples that show people with different types of articulation patterns
Part II (30 minutes)	Reading aloud of informative text
	Questions to guide the global understanding of the text: identification of the text structure and inference of the author's intention
	Cervical movements and rotation of shoulders technique associated with the technique of vibrating sounds
	Vibrant sound technique in modulated emissions
	Nasal sounds technique associated with the mastication technique
	Tongue rotation technique in the oral vestibule associated with the nasal sound technique
	Chewing technique
	Super-articulation technique
Part III (40 minutes)	Reading aloud the same informative text and comparing readings before and after exercises with brief individual feedback
	Reading aloud an advertising text that was aimed at a young audience (therefore, to be read with fast speed of speech, maintaining articulatory precision). Gathering all the skills worked on during this meeting: text comprehension strategies and exercises to ensure well-defined articulations
	Brief individual feedback.
Homework	Performing exercises and reading text in aloud proposed at the meeting
	Self-perception of oral communication and other forms of communication
	Observation of the articulation of speech sounds and their relationship with the content of what is being conveyed
Meeting 5: Frequency and intensity modulation (2 hours)	
Part I (50 minutes)	Participants were scored from 0 to 10 for their involvement in the homework and for their oral communication during the week
	Dialogue exhibition: presentation of slides with examples of audio and video that show people who exhibit different types of frequency and intensity modulation
	Sample audio presentation to show the different vocal inflections according to the text score
Part II (30 minutes)	Reading aloud text in which the same sentence has different meanings according to the position of commas
	Cervical movements and rotation of shoulders technique associated with the technique of vibrating sounds
	Nasal sounds technique associated with the mastication technique
	Basal sound technique
	Blowing technique and high-pitched sound
	Vibrant sound technique in modulated emissions and on musical scales
Part III (40 minutes)	Frequency and intensity modulation technique: reading special phrases for training different inflections, with words previously marked for emphasizing exercise
	Reading poetry aloud. Realizations of how each participant uses vocal resources according to their personal interpretation of the text and the message they want to transmit. Brief individual feedback
Homework	Performing exercises and reading text in aloud proposed at the meeting
	Self-perception of oral communication and other forms of communication
	Observation of frequency and intensity modulation and their relation to the content of what is being conveyed

Meeting 6: Resonance (2 hours)	
Part I (20 minutes)	Participants were scored from 0 to 10 for their involvement in the homework and for their oral communication during the week
Part II (30 minutes)	Reading aloud of advertising text
	Questions to guide the global understanding of the text: identification of the text structure and inference of the author's intention
	Reading aloud informative text before exercises
	Cervical movements and rotation of shoulders technique associated with the technique of vibrating sounds
	Fricative sound technique: emission of fricative sounds together, e.g., "vzj vzj vzj"
	Yawn-sigh technique
	Nasal sounds technique associated with the mastication technique
	Technique of tongue rotation in the buccal vestibule associated with the technique of nasal sounds
Part III (40 minutes)	Reading aloud the same advertising text and comparing readings before and after exercises, with brief individual feedback
	Pitched voice technique associated with articulation sequences and automatic speech
	Reading aloud of informative text with brief individual feedback. Gathering of all the skills obtained during this meeting: text comprehension strategies and exercises to ensure a balanced resonance and promote better vocal projection.
Part IV (30 minutes)	Video recording and an individual reading aloud of the informative text, "Brazil, a country with a partially free press"; the same text was used in Meeting 2, for an analysis of the participants
Homework	Performing exercises and reading text in aloud proposed at the meeting
	Self-perception of oral communication and other forms of communication
	Observation of resonance and its relation to the content of what is being conveyed
Meeting 7: Comparison of oral communication before and after training (2 hours)	
Part I (20 minutes)	Participants were scored from 0 to 10 for their involvement in the homework and for their oral communication during the week
Part II (100 minutes)	Dialogical exposition: presentation of slides regarding verbal expressiveness in the text, drawing attention to the issue that the voice and sound are always loaded with meaning, as well as a review of all the vocal parameters worked during the vocal training, relating the impressions transmitted by the various voice resources
	Explanation of how the next dynamic would happen, i.e., a comparison between videos before and after training. Individual comments, self-assessment, and feedback from colleagues and the speech therapist
	Presentation of the videos of each participant, organized in pairs, recorded in Meetings 2 and 6, and considered as material before and after training, respectively
	Analysis of recordings
	Feedbacks made immediately after watching each student's video
	Comments on points that were improved and those that could still be improved.
Homework	Accomplishment of the exercises proposed during the training program, according to the individual's needs
	Self-perception of oral communication and other forms of communication
Meeting 8: Finalization of the program (2 hours)	
Part I (20 minutes)	Participants were scored from 0 to 10 for their involvement in the homework and for their oral communication during the week
Part II (100 minutes)	Summary of the training proposal, resuming the exercises, and reinforcing the most important points of the program
	Application of assessment protocols
	Individual voice recordings

In the first meeting, a questionnaire developed by the team was administered to the participants to collect sociodemographic and occupational data, including information regarding their sex, date of birth, age, marital status, workload, and working days. The information for our auditory-perceptual evaluation was collected during the first and last meetings with the participants.

The participants were recorded in the studio of the participating radio station. There, they were asked to read an informative text provided by the study authors, which evaluated the effects of the training program[15]. The content of the text had been adapted for its message to be more objective and coherent. The content of the text was as follows: *"Jarbas Barbosa, the new president of Anvisa, advocates change in food packaging. This measure is necessary to facilitate the identification of products with high salt, sugar, or fat content. This information is essential to ensure the conscious choice of all consumers when buying."* Participants were provided this text during the first and last meetings with them.

Participants were recorded in a soundproof studio using an Audio-Technica AT2020 microphone with an anti-puff Shock Mount SH-100 filter. This was connected to two XLR and Canon-branded cables – Canon, plus an audio interface card of the Behringer brand of the U-phoria line and the UMC204 HD model. The distance of the microphone was adjusted to be level with the height of a participant's mouth, with a distance of approximately 5 cm between their mouths and the microphone.

The recordings were edited using the Audacity software version 2.1.3. Only the last sentence of the provided text (i.e., *"This information is fundamental to ensure the conscious choice of all consumers when buying.")* was used as the material for our auditory-perceptual evaluation, since short sentences tend to be well evaluated in auditory-perceptual analyses[15].

Samples of the recordings were selected at random, using the RANDOM function of the Microsoft Excel software version 2016. The samples of two speakers were duplicated before randomization for a further intra- and inter-evaluator reliability analysis. The samples of each speaker were dichotomized into Reading A and Reading B, and only the researchers knew which recordings belonged to the initial moment and the final one (before and after the intervention).

Three speech therapists specialized in voice therapy, which had a minimum experience of eight years in acting with spoken voice professionals, were invited to participate as judges in our analysis of the readings. The materials were uploaded onto Google Drive, and their access was made available to the speech therapists by email. The speech therapists also received blank protocols for recording their auditory-perceptual analyses. Contents were independently analyzed, following only the guidelines that were set out in the documents themselves.

The protocol used for the perceptual assessment was derived from a prior study regarding a training proposal[15]. The assessment was divided into three parts:

- The judge listened to two files of the same speaker, which we called "Reading A" and "Reading B", respectively.
- Following this, the judge could check "similar" on a provided space on the protocol if he considered the two samples to be the same, or "different" if he considered them to be two different readings.
- If the judge were to consider the samples to be similar, he was directed to Part II of the protocol. If he had considered the samples to be different, he would be asked to choose which among them he considered to be the best: Reading A or Reading B. He would also be asked to give the reason for his choice: voice and speech, interpretation, or both. Furthermore, he would be also asked what the most obvious change was: voice clarity, diction, more credible message, or involvement. Finally, the judge would be asked to provide a score from 0 to 10 for each of the readings. Notably, there were subtitles in the protocol that indicated what was considered as "clean voice" (vocal clarity), "sharp diction" (well-defined articulation), "credibility of the message" (what can be believed, credible), and "involvement with the listener" (text interpreted and less read).
- In Part II of the protocol, in which the readings were considered to be similar, the judge classified the degree of vocal deviation for both samples, considering the following categories: 0 for absence of deviation, 1 for mild deviation, 2 for moderate deviation, and 3 for intense deviation.

If the evaluator had identified the samples as different, the same process would occur, however, classifying each reading individually.

- In Parts II and III, the judge had to qualitatively analyze the vocal resources predominant in the readings (i.e., frequency, intensity, speed of speech, pauses, modulation, and emphasis), punctuating the values for these resources as follows: 0 for completely suited to the text, 1 partially suited to the text, and 2 inappropriate to the text. Readings considered similar were analyzed homogeneously and those considered different were analyzed separately.

A simple descriptive statistical analysis was carried out for the sociodemographic, occupational, and unpaired variables. A kappa multiple test was applied to analyze inter- and intra-judge agreement by adopting the values proposed by Landis and Koch (1977)[16]: values less than zero were considered insignificant (poor), between 0 and 0.2 weak, between 0.21 and 0.4 reasonable, between 0.41 and 0.6 moderate, between 0.61 and 0.8 strong, and between 0.81 and 1 almost perfect. Due to the low value of the interjudge agreement we obtained, we chose to consider only the judgment of the speech therapist who showed higher internal coefficients, in this case, having the value of K=1, almost perfect (almost perfect). A paired t-test was used to compare continuous quantitative variables, and a Wilcoxon signed-rank test was used to compare ordinal qualitative variables. A value of $p < 0.05$ was considered to be statistically significant. The R software version 3.6.3 was used for all the statistical tests in this study.

Results

Five women and three men between 19 and 32 years of age (mean=23.12; standard deviation=4.38) participated in this study. All were undergraduate students in social communication and journalism. The majority (n=6) stated they were engaged in part-time paid activities for their radio stations, one announcer reported that he was working on the radio station and in a call center, while another announcer stated that he was also engaged in informal work to complete his income. Only one announcer had received an internship scholarship. All were single. The average number of days they worked was three (standard deviation=9.87).

Among the eight pairs of readings evaluated, the readings of six (75%) were considered to differ from each other, and the readings of two (25%) were considered to be the same. Of the pairs identified as being constituted of different readings (n=6), two were classified as better (33.33%) at the beginning of the training program, while four (66.67%) were better at the end.

The association between voice, speech, and interpretation was pointed out by the judges as the reason by for selecting three (50%) of the readings classified as different, for two (33.33%) readings the reason for their selection was interpretation, and for one (16.66%), voice and speech.

The most evident change was diction (50%), followed by involvement (n=2/33.33%), and credibility (n=1/16.66%).

The mean, median, and standard deviation values of the readings were higher after training and were statistically significant (p=0.00409; Table 1).

Table 1. Comparison of text reading notes before and after training.

Period	Average	Median	Standard deviation	p*
Before	5.2	6	2.82	**0.00409****
After	5.6	6.5	3.27	

Subtitles: *Paired Student's t-test; Before: Note of the speech sample at the first meeting; After: Note of the speech sample at the final meeting; **p<0.05.

The voices with slight deviation before the intervention were slightly larger than at the final moment (Table 2).

Analyzing the vocal resources of the participants before and after the training program, vocal frequency did not alter, with the largest number of participants using it inappropriately. There was a reduction in the "inappropriate" classification for the following vocal resources: intensity, pauses, and emphasis; and an increase in the "inappropriate" classification for speed of speech and emphasis. The "partially suited to the text" variable reduced for speech velocity and modulation, and increased for pauses and emphasis. The "completely suited to the text" variable increased for the following vocal resources: speed of speech, pauses, modulation, and emphasis (Table 3).

Table 2. Comparison of vocal quality classification before and after training.

Vocal quality	Before	After	p*
	n(%)	n(%)	
Absent	3 (37.5)	4 (50)	0.6694
Slight Deviation	5 (62.5)	4 (50)	
TOTAL	8	8	

Subtitle: *Test of stations using the Wilcoxon signed-rank test ; n=number of subjects; %=percentage.

Table 3. Comparison of vocal resources before and after training.

Vocal Resources	Before	After	p*
	n (%)	n (%)	
Frequency			
Completely suited to the text	3 (37.5)	3 (37.5)	
Partially suited to the text	1 (12.5)	1 (12.5)	1
Inappropriate	4 (50)	4 (50)	
Intensity			
Completely suited to the text	2 (25)	3 (37.5)	
Partially suited to the text	5 (62.5)	5 (62.5)	0.4602
Inappropriate	1 (12.5)	–	
Speed of Speech			
Completely suited to the text	–	2 (25)	
Partially suited to the text	6 (75)	3 (37.5)	0.8596
Inappropriate	2 (25)	3 (37.5)	
Pauses			
Completely suited to the text	–	1 (12.5)	
Partially suited to the text	1 (12.5)	2 (25)	0.2673
Inappropriate	7 (87.5	5 (62.5)	
Modulation			
Completely suited to the text	–	1 (12.5)	
Partially suited to the text	7 (87.5)	4 (50)	0.6056
Inappropriate	1 (12.5)	3 (37.5)	
Emphasis			
Completely suited to the text	–	1 (12.5)	
Partially suited to the text	2 (25)	3 (37.5)	0.2954
Inappropriate	6 (75)	4 (50)	

Subtitle: *Test of stations using the Wilcoxon signed-rank test; n=number of subjects; %=percentage.

Discussion

This study aimed to describe the auditory-perceptual effects of the Expressiveness Development Program for Oral Communication, which we applied to several announcers of a university radio station. Although not all statistical inferences presented significant values, possibly due to the sample size, the results analyzed descriptively in this study may be used to guide future training programs with this population and contribute to the literature on university radio stations, since there is a shortage in this regard, even though such stations are a world reality and are on the rise[1, 9].

The results of the training program were assessed using an auditory-perceptual evaluation, which, although subjective, is considered the gold standard for vocal evaluations and has been widely used in the investigation of training results with professional announcers. Despite this, however, there is a lack of systematization in this kind of instrumentalization with regards to the evaluation of oral expressivity[12,15], possibly due to the need for care so as not to lose singular details regarding the different categories of voice professionals. This makes it difficult to compare between findings of other studies and the instrumental affinity of evaluators[17], which may justify the low intra-evaluator agreement values of this study.

Another factor that should be considered when interpreting our findings is the absence of the application of a previous training program for a perceptual assessment. Although the evaluators in this study were speech therapists with expertise in voice and experience in professional voicework – a factor that values evaluation[18] – previous training programs would have enabled the use of learning strategies and greater cognitive flexibility in the collection of references. Moreover, auditory forming is a more robust internal reference system for tasks involving people[19].

Of the eight pairs of readings analyzed, two pairs were considered equal (no effects), two were considered different with improvement at before the intervention (negative effects), and four were considered better after the intervention (positive effects). The average score of the final readings was higher than that of the initial readings (Table 1) and was statistically significant (p=0.00409). This variation of our results can be explained by using the transtheoretical model developed by Prochaska and Diclemente (1982)[20], which indicates the different stages of individual readiness for behavioral change. In this model, change runs through the following levels:

- Precontemplation – there is no perception of the need for change, so there is no recognition of its due importance.
- Contemplation – this level is governed by future and distant considerations of changes, but there are no attitudes that promote new behaviors.
- Preparation – there is a passive intention to make small changes, however, they are not as lasting.
- Action – there is an active intention to apply new habits and behavior in which it is possible to perceive the achievement of certain goals.
- Maintenance – there is a constant effort for the durability of new habits and to avoid possible relapses.
- Termination – the change is accomplished spontaneously without the need for strategies for its consolidation[20].

The development of self-perception of communication was one of the focuses of this training program, and this was assessed based on the following units of oral communication: voice, language, and expressiveness. The most committed participants may have perceived the need to acquire this skill and developed the necessary skills for the profession of a locutor[15], thus performing the proposed activities and repeating the exercises at home. Although no instrument was used to evaluate the stage of readiness for behavioral change among the participants in this study, it is worth noting that not all of the participants were prepared for change. Some participants could have been in different stages of readiness; hence, they presented different results. Certain desired changes will sometimes occur only in suitable environments, and with the necessary support for their particularity[20].

Voice, speech, and interpretation were the top reasons for choosing to perceive differences between readings. This finding is in line with the expectations that the locution model valued in the labor market requires: clear, credible, pleasant, and natural speech, without ignoring the relevant professional aspects required of radio hosts. Consequently, radio hosts are required to have precise articulation, adequate speed of speech, and a healthy voice, with vocal resources properly

employed in line with the content of what they are conveying[7,12,21].

Indefinite articulations generate difficulties in understanding and loss in the credibility of the message one is trying to convey; hence, articulation should be a mandatory communicative competence for social communicators and journalists – the future professions of the participants in this study – being one of the main characteristics that differentiate professionals from non-professionals[21,22]. Justifying such a need, the choice of sharp diction (well-defined articulation) was the most evident change in connection with the readings observed in this study.

Despite the above, the vocal load of a broadcaster is relative and dependent on the programming of the radio station. In short, this category of work has little risk of work-related vocal disorders, compared with other work categories such as teachers and telemarketing operators[23]. Some singularities of radio broadcasting allow us to draw these conclusions: the working day is shorter, working conditions and organizations are better, vocal amplifiers are accessible, and noise levels are low. In university radio stations, this reality appears to prevail, as this study showed that the average number of days the participants worked was three and a half. In addition, the studios and materials used were similar to those used by professional radio stations. Therefore, as evidenced by Mollin et al.[24], the slight deviations regarding vocal quality in the population studied (Table 2) may be related to their vocal behavior resulting from a lack of training, because it is evident that professionally trained speakers engage in more vocally healthy habits.

Voice frequency is defined by the number of times one's vocal folds vibrate, being interconnected to the fulfillment and the tension of their musculature. In this study, there was no evolution connected with this resource (Table 3). Professionals with little professional training tend to read at a more acute frequency. Meanwhile, informative texts typically require a more severe voice frequency, which is associated with a moderate modulation, to demonstrate firmness in the transmitted content. Normally, this variable is described quantitatively using objective measures such as hertz; however, based on a methodological choice and from the perspective of it being a resource of oral communication, this was qualitatively analyzed in our study[22, 25].

Similar to the resource cited in the previous paragraph, intensity is also typically described quantitatively using objective measures such as decibels (dB); however, in our study, this was also analyzed qualitatively. The vocal intensity of the participants was, for the majority, partially adequate before and after intervention; however, there was an adequate intensity increase and an inadequate intensity decrease after intervention (Table 3). Vocal intensity is produced by the pressure of air against the vocal folds. Generally, when reading texts, vocal intensity measures around 60 to 70 dB, which is the ideal measure to convey security and credibility. A low sound may reveal a lack of confidence, and a loud voice represents a lack of professionalism[22].

Initially, most of the participants presented partially adequate speeds of speech; after the training program, these speeds remained between partially adequate (37.5%), inadequate (37.5%), and fully adequate (25%);(Table 3). This communicative resource shows that the voice of a radio announcer cannot be too fast, as this would compromise the intelligibility of the speaker[22]. Generally, with regards to text with serious content, the speed of speech should be average[26].

Breaks in speech should be distributed according to the content being conveyed and the autonomy of the speaker, as these are used as an emphasis resource or resource that delimits verbal content[21,26]. The adequacy of this resource organizes discourse and assists in the understanding of texts, especially with regards to informative texts that require more pauses than poetic texts. In addition, untrained professionals tend to speed up speech and use fewer pauses[22]. In this study, there was a reduction in inadequate breaks, thereby increasing the use of partially adequate breaks following the intervention (Table 3). This resource had also been shown to have a greater evolution in a communication skills training program with students of social communication[12].

Although modulation was partially adequate before and after training, there was a greater predominance of inadequate modulation after (Table 3). The style of voice-over employed with factual texts, such as the news readings used in this study, requires a moderate and less accentuated modulation compared to sports news voice-overs and relaxed content[25].

The emphasis resources had a slight evolution after the intervention, but most of the emphasis was classified as inadequate both before and after training, especially before (Table 3). These findings diverged from the evolution presented in a study regarding training course with students of social communication[12]. Emphasis influences the understanding of content being conveyed, highlighting relevant words[21]. It is a spontaneous resource and easy to handle by both professionals and non-professionals; hence, training to improve such aspects may not determine the correct use of these resources in all contexts[26].

The scientific literature portrays unmet demands from the university population in terms of supporting the need for training in oral communication[11,27], these trainings enable the undergraduate, even during a professional training period, to access the skills necessary for their insertion in the labor market4.This study corroborates other studies that showed promising results with regards to communicative training for students[10] of social communication, journalism[12,15,16], and radio[26].

Future scientific investigations with this population should contemplate the use of other instruments and methods to evaluate oral communication, for example, self-assessment and an acoustic analysis of speech. In addition to instruments that evaluate one's stage of readiness for behavioral change, and that this taxonomy is also included in the proposals for interventions with this population, future studies should be conducted with larger samples, while respecting a limit between 12 and 15 participants per intervention group[12] and measuring the development of communicative skills in the long term.

Conclusion

The investigated readings presented higher values following the training program, with statistical significance. Meanwhile, vocal quality and certain vocal resources (i.e., intensity, speed of speech, pauses, modulation, and emphasis), except frequency, showed a discrete evolution by the end of the training program. Studies with larger samples and different instruments of evaluation for oral communication should be carried out to stimulate the development of measures regarding the effectiveness of training with announcers of university radio stations.

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