Vocal Characterization of the students of the Department of Social Communication of the Federal University of Sergipe

Caracterização vocal dos discentes do Departamento de Comunicação Social da Universidade Federal de Sergipe

Caracterización vocal de los estudiantes del Departamento de Comunicación Social de la Universidad Federal de Sergipe

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Abstract

Introduction: this study provides interfaces between the speech and the area of social communication, contributing to the development of proposals for health promotion and vocal expressiveness improvement. **Objective:** To characterize the quality of life in voice, vocal health, expressive resources and vocal parameters in students of the Department of Mass Communication, Federal University of Sergipe. Material and **Method:** Cross-sectional study of quantitative-qualitative approach, sample of 46 students, in which the instruments to assess the vocal profile were applied, Quality of Life in Voice; interview guide for general health; assessment of voice and speech fluency; Consensus Auditory-Perceptual Evaluation of Voice. **Results:** students have shown an average total V-RQOL scores was 83.33 ± 12.88; socioemotional 90.72 ± 12.99; physical 78.29 ±14, a self evaluation of a "good to reasonably" voice. In female voices there is an association between high pitch, low loudness and bigger maximum phonation time fricative of /s/; in male voices low pitch, high loudness and abrupt vocal attack. In general sample there is statistical association between modified diadochokinesia and mean elocution rate syllables/minute; emphasis and intonation. **Conclusion:** the students reported having vocal health, positive impact on quality of life, predisposing to laryngeal vocal parameters overload and natural use of prosodic features, implying demand for speech therapy and vocational training qualification, covering non-verbal features of speech and vocals.

Keywords: voice, social communication, auditory perception, quality of life, students.

Resumo

Introdução*: o presente estudo propicia interfaces entre a fonoaudiologia e a área de comunicação social, contribuindo para o desenvolvimento de propostas para promoção da saúde e expressividade no aperfeiçoamento vocal. Objetivo: caracterizar qualidade de vida em voz, saúde vocal, recursos expressivos e parâmetros vocais em estudantes do Departamento de Comunicação Social da Universidade Federal de Sergipe.* ***Material e método:*** *estudo transversal de abordagem quantitativo-qualitativa, amostra de 46 estudantes, nos quais foram aplicados protocolo sobre Qualidade de Vida em Voz; roteiro de entrevista sobre saúde geral; avaliação da voz e fluência da fala; Consensus Auditory–Perceptual Evaluation of Voice.* ***Resultados:*** *estudantes apresentam média dos escores QVV total 83,33± 12,88; socioemocional 90,72± 12,99 e físico 78,29 ±14, autoavaliação da voz "razoável a boa". Em vozes femininas há associação pitch agudo, loudness fraca, maior tempo máximo de fonação de fricativo /s/; e em vozes masculinas pitch grave, loudness forte, ataque vocal brusco. Na amostra geral há associação entre diadococinesia alterada e média de taxa de elocução de sílabas/minutos; ênfase e entoação.* ***Conclusão:*** *os discentes referem ter saúde vocal, impacto vocal positivo na qualidade de vida, parâmetros vocais predisponentes à sobrecarga laríngea, uso natural de recursos prosódicos, sugerindo demanda de intervenção fonoaudiológica e habilitação na formação profissional, abrangendo recursos de expressão não verbal e vocal.*

Palavras-chave: *voz, comunicação social, percepção auditiva, qualidade de vida, estudantes*

Resumen

Introducción: *este estudio proporciona interfaces entre la fonoaudiología y el área de comunicación social, contribuyendo al desarrollo de propuestas de promoción de la salud y expresividad en el perfeccionamiento vocal.* ***Objetivo:*** *Caracterizar calidad de vida en la voz, salud vocal, recursos expresivos y parámetros vocales en los estudiantes del Departamento de Comunicación de Masas de la Universidad Federal de Sergipe.* ***Material y Métodos:*** *estudio transversal de enfoque cuantitativo-cualitativo, con una población de 46 estudiantes, a quienes se aplico el protocolo sobre Calidad de Vida en la voz; un guión de la entrevista sobre la salud general; una evaluación de la voz y de la fluidez del habla, y el Consensus Auditory–Perceptual Evaluation of Voice.* ***Resultados:*** *los estudiantes presentan*

puntuaciones medias de QVV total de 83,33 ± 12,88; socioemocional 90,72 ± 12,99; físico 78,29 ±14, autoevaluación de voz de "buena a razonable". En las voces femeninas hay asociación entre pitch agudo, loudness débil; mayor tiempo máximo de fonación del fricativo /s/; y en las voces masculinas pitch grave, loudness fuerte, ataque vocal abrupto. En la población hay asociación estadística entre diadochokinesia modificada y media de tasa de elocución sílabas/minuto; énfasis y entonación. ***Conclusión:*** *los estudiantes reportaron tener salud vocal, impacto vocal positivo sobre la calidad de vida, parámetros vocales que predisponen a una laríngea, y uso natural de recursos prosódicos. Eso sugiere una demanda por intervención fonoaudiológica y por una habilitación profesional que abarque los recursos de expresión no verbal y vocal.*

Palabras clave: *voz, Comunicación Social, percepción Auditiva, calidad de vida, estudiantes.*

Introduction

Speech-language pathology (SLP) works in the field of professional voice to meet the demands for vocal preparation—of teachers, radio broadcasters, reporters, actors, or singers. The assistance of SLP is aimed at improving communication skills in professional voice use[1] starting with the identification of limitations and potentialities and tailoring professional performance to the requirements of the business, media, type of program, and target audience[2].

A voice profile characterizes groups of professionals based on the analysis of patterns and models of elocution, an assessment of vocal and non-verbal resources, reports of voice training experiences, and attitudes in professional voice use[3]. Otolaryngological and SLP assessments are intended to provide an understanding of the function of structures involved in vocalization[4] and offer the professional voice user—with or without a voice disorder—a physiological basis for healthy vocal performance, thereby meeting the demand for vocal flexibility and identity.

The concept of vocal well-being encompasses life habits conducive to a lifelong healthy voice produced without strain and pleasant to the listener, with attention given to risk factors for loss of vocal health[5] that could reflect in the speakers' "vocal self-image" and in the way they judge their own vocal resources[6].

Studies have revealed the relationship between vocal health and quality of life using self-report questionnaires[7] that probe the perception of subjects with regard to their voices and the multidimensionality of physical, mental, and social well-being[8]. In Brazil, a number of voice-related quality of life (QVV) protocols[8] have been validated, such as the Voice-Related Quality of Life (V-RQOL) protocol, which allows for an evaluation of the effectiveness of intervention programs for a variety of specific demands.

The auditory-perceptual analysis of voice using specific protocols and scales to measure voice parameters makes it possible to correlate anatomical and physiological aspects of voice production to sex, age, culture, severity of deviance, and overall impression of the speaker's vocal quality[9].

The oronasal mode and the costal/diaphragmatic-abdominal type of breathing are mechanically more effective for phonation. Respiratory-phonatory-articulatory coordination (CPFA) corresponds to the harmonious functioning of those three levels, speech rate, use of reserve air, and breath pauses[4]. Vocal attack refers to glottal adduction during phonation[3].

The quantitative and qualitative investigation of phonatory measures of sustained phonation on one exhalation (in seconds ['']) represent the maximum phonation time (MPT) of the vowels /a, /i/, /u/, and the fricative consonants /s/ and /z/. Values of less than 10' are outside of normal limits and highly suggestive of respiratory or phonatory inefficiency. The norm for the s/z ratio is 1.0, which implies glottic efficiency[3].

For efficient voice production, the vertical axis of the spine should be aligned, the body weight distributed on plantar support, thorax and shoulder girdle should have no signs of tension, maintaining raised shoulders and expanded chest[5]. The position of the larynx at rest and on phonation is assessed using manipulation to approximate the thyroid cartillage laminae, and anterior and vertical digital pressure on the larynx[3].

One of the rhythmic aspects of phonation is diadochokinesis—the rapid repetition of speech segments—which reflects neuromotor coordination and mobility and position of the articulators, whose

displacement is measured by the speech rate (SR)[10]. During spontaneous speech and/or reading, the SR takes into account the total number of fluent syllables (200) divided by the total duration of speech measured on a stopwatch and including the pauses. The norm for Brazilian speakers is 94.9 to 125.3 words/minute; 185.0 to 235.6 syllables/minute[11].

Expressiveness when conveying a message in a clear and attractive manner with credibility and energy materializes the speaker's intention and captures the listener's attention using both verbal and non-verbal resources. Verbal communication is related to message content and accounts for 7% of the effect of communication, while 93% corresponds to non-verbal resources, which include body language (55%); voice and its inflections (38%) with variations in speed, intensity, pitch, and duration[12].

Emphasis highlights phonation by strengthening the intensity of the stressed syllable, using precise articulation and a slow speech rate. Intonation refers to variations in pitch and melody in speech. Breath pauses can be short or long, in the case of an expressive pause[13], and duration allows for inferences with respect to the time of pauses and segments or lengthening[14].

Communication professionals use their skills to elicit entertainment, information, or persuasion. Today, radio employers prefer natural-sounding voices and professionals skilled in multi-tasking, who are able to work with equipments, scripts, blogs, photos, videos, music, and more[15].

The knowledge of the Journalism student concerning his or her voice is subordinated to the so-called "ideal models" under sociocultural influence on the construction of their voice and the conditions for building the subject's singularity[6]. This prompts a reflection on the role of expressiveness in the practice of SLP[14] and the understanding of the use of verbal and non-verbal resources, in addition to vocal health care.

A recent study in Brazil offered an analysis of the real contribution of SLP in the work with communication (both verbal and nonverbal); it also analyzed all the aspects related to expressiveness in the speech of senior audiovisual production technology students. Few courses in the SLP curriculum prepare and train professionals in this area. It should be noted that in vocational training courses and university programs the inclusion of a speech-language pathologist is not consensus[6].

The present study offers interfaces between SLP and the area of media communication, contributing to the development of propositions aimed at health promotion and oral expression, being relevant to investigate the functional, social, and emotional impact of voice-related quality of life, and also to adjust the vocal profile and non-verbal components of communication to a specific demand in their professional activity.

In light of this, the objective of this study was to characterize the voice-related quality of life, vocal health, expressive resources, and voice attributes of college students of Media Communication at the *Universidade Federal de Sergipe* (UFS).

Material and method

This investigation was a quantitative and qualitative cross-sectional study included in the Project for SLP Intervention in Voice, Speech, and Fluency, approved by the UFS institutional review board under protocol CAAE 0257.0.107.000-11.

The sample included 46 students of the UFS Media Communication Department (DCOS): 34 (73.9%) in the Journalism program, 10 (21.7%) in Audiovisual, and 2 (4.3%) in Publicity/Advertising. Of the 46 students, 23 were female (mean age, 22.17 ± 5.23 years) and 23 were male (mean age, 23.60 ± 5.94 years). The overall mean age of the sample was 22.89 ± 5.03 years. The DCOS offered SLP students from the 2009/2 class to the 2012/1 class the opportunity to apply for SLP Teaching Clinic service. The students who showed interest and enrolled in the activity participated in the SLP assistance following the order of the list of applicants.

The DCOS students were contacted and informed about the aims of the study; those who accepted to participate provided written informed consent (Appendix I). The data were collected individually by the administration of the SLP evaluation tools: Quality of Life and Voice (QVV) protocol8; interview script; assessment of voice and speech fluency[17,3,12], and the CAPE-V protocol.

The QVV protocol measures the impact of voice on the individual's quality of life in 10 items computing scores of overall, physical, and social--emotional domains. Additionally, students answered a separate question to self-rate their voices on a scale: poor, fair, good, very good, and excellent".

A semistructured interview (Appendix II) was used to gather data of self-reported general health, life habits, voice use, environment factors, voice-related symptoms, laryngopharyngeal sensations, vocal self-image, listener's impression, expressive resources of preferred voices and curricular disciplines, categorized into groups composed of judges-examiners who analyzed the speech transcripts and texts of the course descriptions.

The protocol for voice and speech fluency evaluation[3,12,17] (Appendix III) included the standardized tasks and tests to rate a) the voice parameters: type of voice, resonance, articulation, type and mode of breathing, CPFA, vocal attack; b) the phonatory measures: MPT /a/,/s/, /z/, s/z ratio, SR per minute of informative text (143 syllables, 71 words)[12], diadochokinesis, rhythm, phonation characteristics; c) the prosodic resources: emphasis, intonation and duration; and d) body posture evaluation: overall body posture, facial expression and gestures, and position of the larynx at rest and during phonation. The results for each variable were grouped into categories according to the literature for assessment of associations.

Resonance, articulation, and breathing were evaluated from observations of the subjects at rest and during connected speech and semi-spontaneous speech over the course of the interview. The students were not aware that they were being evaluated, lest they might change their natural respiratory and articulatory dynamic. In addition, resonance was assessed with the aid of intermittent occlusion of ther nose by digital compression of the nasal wings as the subject produced the vowel /i/ to identify the focus of resonance. Articulation was assessed using a diadochokinesis task with repetitions of sequences of syllables and reading of an informative and a commercial text. Breathing was evaluated through observation of the vocal dynamic in the resistance test in a countdown from 100 to 1 (Appendix III)[3].

The CAPE-V relies on the production of a sustained vowel, sentences, and spontaneous conversation. It evaluates six attributes: overall severity of the voice deviance; roughness (irregularity in the sound source); breathiness (audible escape of air); strain (excessive vocal effort); pitch, and loudness adjusted for sex, age, and cultural background. The degree of deviance is indicated as absent, mild, moderate, or severe on a linear analog scale (from 0 to 100 mm). The presence of deviance across speech tasks was defined as consistent while the non-systematic occurrence of deviance was judged as intermittent[9].

The auditory-perceptual analysis of voice was conducted in loco and also with the aid of audio and video recordings, based on the most frequent answers and on the reliability of the 10 judges/examiners: the supervising teacher, trainees, Outreach Project scholarship students, school monitors in the area of voice in the SLP program, and one DCSO student.

The statistical analysis was done using the Statistical Product and Service Solutions SPSS/PC software, version 17. The percentage (%) of variables observed per number of individuals (n) were grouped based on the theoretical framework (n, %). Associations were analyzed using the chi-squared and Fischer's exact tests, and relative risk (R) for exposure $R > 1$, protection $R < 1$. The continuous variables were expressed as means and standard deviations (SDs). Student's t-test was used for comparisons of independent samples and Spearman's correlation $p < 0,05$.

Results

The DCOS students had the following mean QVV scores: 83,33 ± 12,88 overall; 90,72 ± 12,99 in the social-emotional domain, and 78,29 ± 14,90 in the physical domain. On QVV item 7, they reported a small to serious problem "in my job or to succeed in my profession, because of my voice" (n=20; 60,6%) and on QVV item 9 "I have to repeat what I say to be understood" (n=24; 72,7%).

Females self-rated their voice as "poor" to "fair" (n= 10; 30,3%) while males reported having a "good" to "excellent" voice (n= 10; 30,3%). Both females and males reported a positive vocal self-image (n=21; 63,3%) and a pleasant impression of listeners regarding their voice (n=19; 57,6%).

Students sought the SLP service because they were motivated by the perspective of vocal improvement (n= 25; 54,3%) or due to complaints (n= 21; 45,6%) related to speech fluency (n=20; 43,4%) and vocal quality (n=15; 32,6%).

The data on vocal health and expressive resources are shown in Table 1, while the analysis of their associations can be seen in Table 2.

Table 1 - Vocal health and expression of resources for students self-reported for social communication department students from Universidade Federal de Sergipe (n = 33)

		n	%
General Health	**Consultation ENT/ No pathology**	25	75,8
	Other problems	8	24,2
Drugs	**Analgesics Drugs / Antibiotics / sprays / pad**	15	36,4
	No use	21	63,6
Food	**Balanced**	25	75,8
	Signal Gastroesophageal reflux	8	24,2
Sleep	**Normal**	19	57,6
	Changed	14	42,4
Alcohol	**No**	20	60,6
	Fermented / Distillates	13	39,4
Vocal use	**Use vocal environmental Competition High Speech / Shout**	19	57,5
	Does not refer vocal abuse	14	42,4
Environmental factors	**Environmental Factors Thermal shock / Pollution**	21	63,6
	Does not mention	12	36,4
Laryngopharyngeal sensations	**Tension in the shoulder girdle**	7	21,2
	Hawking	4	13,1
	Dryness	8	24,2
	Scratchy throat	1	3,0
	Stinging or burning	2	6,1
	Lump in the throat	4	12,1
	Does not mention	7	21,2
Vocal Symptoms	**Symptoms Fatigue and Stress vocal in speaking**	7	21,2
	Voice failures	3	9,1
	Shortness of breath to speak	1	3,0
	aphonia	3	9,1
	Weak voice, low and air	3	9,1
	Hoarseness	7	21,2
	Pain when talking	1	3,0
	Does not mention	8	24,2
Expression Resources	**Nonverbal Expression Features**	4	12,1
	Verbal	9	27,3
	Vocal	9	27,3
	Both	11	33,3

Table 2 - Association between feeling laryngopharyngeal, symptoms vocal, environmental factors, such habits of life for social communication department students from Universidade Federal de Sergipe (n = 33)

		Referred sensations		p
Vocal changes	**Hoarseness**	2	5	0,572
	Other changes**	5	9	
Environmental factors	**Air-Conditionair**	5	8	0,559
	Pollution	2	2	
		Referred vocal changes		
		Hoarseness	**Other sensations****	**p**
Sleep	**Normal (8 hours)**	4	6	0,184
	Changed	1	8	
Smoke	**Yes**	0	2	0,510
	No	7	16	
Alcohol	**Fermented**	2	5	0,663
	Distillates	5	13	
Vocal use	**Environmental competition**	3	6	0,335
	Speak loud/shout	1	7	

Fisher's exact test $p \leq 0,05$.
*Other sensations 1. Shoulders and neck tension; 2.Clear the throat; 3.Dryness; 4. Persistent cought; 5. itch; 6. Scraping throat; 7.Pain in the neck; 8. Weight or throat tightening; 9. Chest pression; 10.Ardor; 11. Throat lump; 13.Pain and difficulty when swallowing; 13. Choking; 14. Not referred.
**Other changes: 1. Vocal tiredness; 2.Effort; 3. Voice flaws; 4. Shortness of breath; 5. Aphonia; 6. Weak, low and with air voice; 7.Hoarseness; 9.Pain when speaking; 9. Not referred.

Transcripts of the students' statements regarding verbal, non-verbal, and vocal resources identified in preferred voice models are shown in Figure 1.

Figure 2 lists the courses in the undergraduate program that were most cited by the students as addressing expressive resources: Radio Laboratory, Journalism I, Television I. The course descriptions of those disciplines include topics such as techniques, aesthetic attributes, genre, and style.

Subject number	Gender	Empowerment	Favorite voice model	Cathegory	RV	RNV	RVO
15	F	Journalism	*"SA, very beautiful: she knows gesture and speak very well, she knows in as few words the message, the content has objectivity."*	Objetectivity, synthesis, gestures	1	2	2
23	M	Journalism	*"WB for stability and intensity of the facility to be understood"*	Listener attention, Balance	1	1	2

Legend: Female (F); Male (M); Verbal resources (RV); Nonverbal (LB); Vocals (VOR); 1= Refers; 2= not referred

Chart 1 - Voice preferred by students of the department of social communication from Universidade Federal de Sergipe

Subject number	Gender	Empowerment	Favorite voice model	Cathegory	RV	RNV	RVO
29	F	Journalism	*"SC, I think a natural voice without effort with a strong voice. Really observe the diction of the people who speak to me, pronunciation, word breaks; sometimes not pay attention to what is being said, just as is being said, as the person speaks."*	Tension, Diction, Pronunciation , (rhythm and articulation), fluency, aesthetics	2	1	1
32	M	Journalism 3rd term	*"EC has clean and open voice, expansive because of time, grin, a lighter paper. WB voice is more serious, closed."*	Oral Resonance (Projection)	2	1	1

Legend: Female (F); Male (M); Verbal resources (RV); Nonverbal (LB); Vocals (VOR); 1= Refers; 2= not referred

Continuation Chart 1 - Voice preferred by students of the department of social communication from Universidade Federal de Sergipe

Expression of resources - speech Transcript	Disciplines names	Menu (DCOS)
"Learn to express themselves and have a good fluency"	RadioJournalism Laboratory	History of radio journalism in Brazil: first experiences. Current situation and concepts. Critical experiences in the evaluation and analysis of journalistic production in radio in Brazil. The oral and written language and the radio language. Production styles of laboratory programs in radio journalism.
"Rhetoric to learn to talk and persuade the other delight and be objective"	Communication Theory I	Introduction to communication. Brief history. Contexts and paradigms in sobrea Media research. Hypodermic theory. The mass society. Empirical-experimental approach or persuasion. Functionalist theory.
"Using gestures, increased voice when is not heard, posture establishing voice when you talk to those who do not know, to be understood. The course works more intellect that oral "	Radio I	Reveal the creative potential of radio language, its resources and its limitations. Point the vehicle development process and its implications.
"Drinking natural water to prevent inflammation and the communicator should talk to property and intelligibility"	Radio II	Analysis of experience in educational radio. Recreational radio function. Analysis programs. Development of educational radio programs, cultural and entertainment.

Chart 2 - Subjects referred by social communication department students from Universidade Federal de Sergipe addressing expression of resources

Expression of resources - speech Transcript	Disciplines names	Menu (DCOS)
"The need for a proper communication based on the knowledge that, who and how is speaking, a good speech, writing, search sources, capacity persuasion, culture, and understanding the language-social agreement "	Production and text reception I	O texto e sua caracterização. Mecanismos de textualidade. A coesão e a coerência textual. Produção e recepção textual.
"In addition to drinking plenty of water like screaming before entering the studio, regarding the profession states that it is essential to be ethical, truthful and ascertain the facts, the credibility, the form of expression, to direct people and a good text also"	Television I	Discipline which studies the content of journalistic language on television.

Continuation Chart 2 - Subjects referred by social communication department students from Universidade Federal de Sergipe addressing expression of resources

The predominant voice types were: nonfluent voice (n=34; 73,9%) comprising hoarse, rough, breathy, and strained glottal source deviances (n=8; 17,3%); voices related to sex and age, infantile (n=13; 28,2%) and vertical focus of resonance (n=13; 28,2%).

The resonance system was assessed for balanced diffusion of sound quality, concentration in the vertical laryngeal focus and hyperfunction of the oral and nasal cavities[3]. Considering the overall sample, these elements were categorized into balanced-oral resonance (n=20; 43,5%) and laryngeal--nasal resonance (n=26; 56,5%), displayed by sex in Table 3. In both sexes, voice type and resonance were significantly associated (p =0,0020); in males, nonfluent voice was associated with laryngeal-nasal resonance (p < 0,0001).

Limited fluency and vocal apparatus hyperfunction[3] are related to two elements of articulatory dynamics: the precise or imprecise movement of lips and exaggerated or locked mouth opening, which were grouped for the analysis of associations. In the overall sample, precise-exaggerated (n=15; 32,6%) and imprecise-locked (n=31; 67,4%) articulation are observed, both depicted by sex in Table 3. There is an association between articulation and CPFA (p = 0,002) in the overall sample, and between imprecise-locked articulation and abnormal CPFA among males (p = 0,0001).

Females showed an oro-nasal breathing mode (n = 14; 60,9%) while males had nasal breathing (n = 12; 52,2%). Considering the overall sample, four breathing types were noted: clavicular, thoracic, abdominal, and costal/diaphragmatic, grouped according to the forward movement[3] into costal/diaphragmatic-abdominal (n = 14; 30,4%) and according to upward movement of breathing as clavicular-thoracic (n=32; 69,6%), shown by sex in Table 3.

Females were found to have adequate diadochokinesis (n=13; 56,5%), which was impaired in males (n=13; 56,5%).

In Table 3 are the results of the SLP evaluation by sex: normal speech rate, regular rhythm, and characteristics of phonation with sound breaks; association between emphasis and intonation (p=0,0001); and between emphasis and duration (p= 0,001).

In the overall sample, alignment alterations are seen in the vertical axis of body posture (n=9; 19,6%), tension in the shoulder girdle (n= 31; 67,4%) and ribcage (n = 6; 13,0%); use of facial mimicry and gestures (n = 43; 93,5%); normal position of the larynx at rest and elevated on phonation (n = 32; 69,6%), data presented by sex in Table 3.

Table 3 - Profile vocal in both genders' students of the social communication department from Universidade Federal de Sergipe (n = 46)

Vocal Profile	Female Gender		Male Gender	
	n	%	n	%
Resonance larynx-Nasal	13	56,5	13	56,5
Breathing type Clavicular-Thoracic	11	47,8	12	52,2
Imprecise-Locked joint	15	65,2	16	69,6
Changed CPFA	12	52,2	13	56,5
Normal speed speech	14	60,9	20	87,0
Regular Rhythm	14	60,9	19	82,6
Loudness Break	8	34,8	8	34,8
Emphasis	8	57,1	8	57,1
Tone	8	57,1	9	64,3
Duration	11	78,6	10	71,4
Vertical axis changes in body posture level	19	82,6	12	52,2
facial expressions and gestures use	21	91,3	22	95,7
Normal Larynx Position	17	73,9	15	65,2
Discreet degree of Vocal Attack	20	87,0	19	82,6
Isochronic Vocal Attack	13	56,5	12	52,2

Legend: CPFA: pneumophonoarticulatory coordination; n = number of subjects; % = Percent

In both male and female students, there was an association between lower mean speech rate in syllables/minute (Table 4) and impaired diadochokinesis (p = 0,016).

Table 4 - Rate in speech students of social communication department. word values / minute, syllable / minute expressed in mean and standard deviation (n = 28)

	Elocution Rate	Average	Standard deviation	Minimum	Maximum
General Sample n = 28	**Palavra/minuto**	146,67	27,58	88,70	200,10
	Sílaba/minuto	280,02	61,34	101,88	357,50
Female Gender n = 14	**Palavra/minuto**	147,39	19,27	100,00	170,00
	Sílaba/minuto	294,67	40,03	188,70	342,00
Male Gender n =14	**Palavra/minuto**	145,95	34,75	88,70	200,10
	Sílaba/minuto	265,37	75,83	101,88	357,50

Legend: n = individuals numbers. Standard female: 239.8 to 282.2 syllables / minute and 129.8 to 156.5 words / minute. Standard male: 94.9 to 125.3 words / minute and 185.0 to 235.6 syllables / minute (Andrade, 2003).

Table 5 shows the mean MPT (in seconds) for the vowel /a/, consonants /s/ and /z/, and the mean s/z ratio within normal limits. For females, an association was found between weak loudness and longer MPT for /s/ (p = 0,008) and for /z/ (p = 0,011).

Table 5 - Maximum phonation time in seconds and relationship s / z in students of the social communication department from Universidade Federal de Sergipe (n = 46)

	TMF (seconds	Average	Standard Deviation	Minimum	Maximum
General Sample n=46	/a/	11,08	3,16	5,00	20,00
	/s/	12,32	5,13	2,00	24,00
	/z/	11,43	4,46	3,00	21,00
	Relation s/z	1,09	0,39	0,20	2,40
Female Gender n = 23	/a/	10,34	2,97	5,00	17,00
	/s/	11,52	5,37	3,00	24,00
	/z/	10,13	4,69	3,00	21,00
	Relation s/z	1,16	0,45	0,60	2,40
Male gender n = 23	/a/	11,82	3,22	7,00	20,00
	/s/	13,13	4,87	2,00	20,00
	/z/	12,73	3,88	8,00	21,00
	Relation s/z	1,03	0,30	0,20	1,60

TMF no normal <10 high significance; TMF pattern: 15-20 seconds; the s / z = 0,8 -1,2

Table 6 illustrates the association between pitch and loudness. In the overall sample, there are associations between pitch and vocal attack (p=0,019); loudness and vocal attack (p = 0,007), strong loudness and hard vocal attack in males (p=0,014), there is a trend toward weak loudness and soft vocal attack in females (p = 0,076).

Across the sample, the CAPE-V analysis showed mild roughness (n= 15; 32,6%), breathiness (n= 8; 17,4%), and strain (n= 23; 50%), which were found to be intermittent for the evaluated tasks.

Table 6 - Pitch pool and loudness by gender in students of the social communication department from Universidade Federal de Sergipe (n = 46)

		Loudness				
	Sample n=46	**Strong (n=27) 58,70%**		**Weak (n=19) 41,30%**		**p**
Pitch	**Agudo (n=20)**	6	30,00%	14	70,00%	0,001*
	Grave (n=26)	21	80,77%	5	19,23%	
	Gênero Masculino(n=23)	**Strong (n=17) 73,91%**		**Weak (n=6) 26,90%**		**p**
	Agudo (n=7)	3	42,86%	4	57,14%	0,045*
	Grave (n=16)	14	87,50%	2	12,50%	
	Gênero Feminino n=23	**Strong (n=10) 43,48%**		**Weak (n=13) 56,52%**		**p**
	Agudo (n=13)	3	23,08%	10	76,92%	0,040*
	Grave (n=10)	7	70,00%	3	30,00%	

* = Significance level. Fisher's Exact Test, p ≤ 0,05

Discussion

The present study characterized the voice-related quality of life, vocal health, expressive resources in preferred voices and curricular disciplines and voice parameters, which were grouped for the investigation of associations.

Regarding voice-related quality of life, DCOS students of both sexes had a total QVV score of 83,33 and voice self-ratings from "poor" to "fair". This contrasts to the findings of another study using the same assessment instrument, which found a total score of 99,88 and self-ratings ranging from "good" to "very good" (92%) also with radio

broadcasting students[3]. The data of the present study confirm that students in this field show a negative perception of their voice[6].

The score of 78,29 in the physical domain of QVV by DCOS students was close to the score of 71.10 obtained by Brazilians with voice complaints[9]. The mean socioemotional QVV score was 90,72, which seems to underscore the common sense that "having a good, beautiful voice" motivates the professional training of the radio performer1[8], a trend that is evident among males with a self-evaluation of a "good" to "excellent" voice, positive vocal self-image, and a pleasant listener's impression.

On items 7 and 9 of the physical domain of QVV, students report some problems "on the job" and having to repeat what they say to be understood, suggesting, respectively, the extent of voice demands in the academic setting and the importance of phonatory and articulatory coordination to impart credibility to the message.

The interest shown in the SLP service reflects the interest of the students in improving vocal health and expressiveness[2]. The complaints related to voice, speech, and fluency represent limitations (projection and expression) and potentialities for improvement, data that support SLP interventions in the preparation of the future professional of media communication.

Students are approaching the period of maximal vocal efficiency in the age range of 25 to 45 years, susceptible to laryngeal structural alterations of greater or lesser impact[19]. However, the self--referral to otolaryngological examination and non--use of self-medication indicate their care for vocal health[20]. Moderation in alcohol consumption and a balanced diet seem to contribute, respectively, to preventing vocal fold lesions and gastroesophageal reflux[5]. In contrast to other studies with communication students[21], the DCOS undergraduates report monitoring their effort when speaking, indicating conscientious voice use and a relative vocal rest[5] by restraining the amount of high-intensity speech (Table 1).

No significant associations were found in the study population between sensations, voice problems and environment factors, nor between life habits and voice use. These findings support the notion that individual vocal resistance depends on metabolic, genetic, neurological, behavioral[5], and environmental factors, as students have to cope with voice demands in acoustically unfavorable environments (Table 2).

In models of preferred voices and in transcripts of statements regarding the course descriptions of the DCOS program disciplines, the students allude to resources of non-verbal expression, underscoring the aspects related to vocal health (breathing, voice warm-up, body posture, hydration, and environment). The resources perceived in the preferred voices (Figure 1) indicate the importance of vocal quality integrated with the verbal message and concerns for the audience[14], cultural background, and relationship with the media.

In the DCOS course descriptions (Figure 2), style is defined as a verbal and vocal resource, a recurring feature in oral expression, using a combination and variation of the prosodic and grammatical resources with linguistic and pragmatic functions[14]. The relationship with the broadcasting company and market trends are also mentioned in the statements of the students and identified in the course descriptions in topics regarding production conditions, circulation, and consumption of messages.

Among the types of voice evaluated, a hoarse voice in females indicates the breathiness signals heard in commercial broadcasting[22]. In males, the vocal fry signal may imply vocal abuse, misalignment of vocal folds or phonic inadaptation[3].

Balanced resonance indicates muscle mobility and is not restricted to the velopharyngeal compenation[17] of nasal resonance and the oral component does not represent exclusively a concentration of energy in the mouth cavity[3]. In laryngeal resonance, the low vertical focus is due to laryngeal and pharyngeal hyperfunction, resulting in strained phonation[2]. After possible organic causes have been excluded, the predominance of laryngopharyngeal -nasal resonance points to the production of vibration in the nasal cavity to compensate for an intense low vertical focus (Table 3).

Imprecise-locked articulation can lead to hypeerfunction of the vocal apparatus of students; transient articulatory imprecision of a natural phonation can offset the benefit of overarticulation for voice projection[3] (Table 3).

The clavicular-thoracic breathing of the students includes elevation of shoulders and ribcage, which could entail insufficient intake of air and use

of reserve air in short inhalations out of synch with syntactic pauses, or long inhalations[3] promoting a harsh vocal attack, elevated larynx position on phonation, thus propitiating vocal fatigue (Table 3).

In females, the oro-nasal breathing mode indicates quick air intake while in males the predominantly nasal breathing mode is optimal for warm-up, humidification, and filtration of the inhaled air[17], corroborating the vocal health care.

Considering the overall sample, misalignment of the vertical axis of the body stance and shoulder girdle tension could indicate restrained mobility of the raised ribcage during breathing, which results in effortful phonation. Therefore, lack of postural balance prompts functional and structural compensations in the vocal apparatus[19]. In students, there was no statistically significant association between neck tension and raised larynx position on phonation. Nevertheless, this could influence the unbalanced resonance of voice projection, leading to compensatory efforts (Table 3).

Gestures and facial mimicry impart intention to communication and activate the phonation and expression systems; they also seem to influence the internal direction of breath such that the glottal sounds, when directed to the supraglottic cavities[23] likely favors greater stability in connected speech and minimizes the signs of sound breaks in the sustained phonation of the DCOS students (Table 3).

Pauses of hesitation, natural breaks in the speech and altered CPFA of the students corroborate the data on commercial radio broadcasting[24]. The CPFA is not differentiated into better and worse voice, and depending on the text size, a slight abnormality is not determinant in the interpretation of the message[25]. In oral reading, short pauses contribute to a dynamic rhythm, credibility, and reliability of the message; sequences of prominent and non-prominent syllables in the structure of co-articulated speech produce a unique rhythmic effect[14] (Table 3).

The associations between length, intonation, and stress highlight the fact that prominence in words is independent of the timing of commercial broadcasts[14,2] and the influence of voice and speech training[13]. Better articulation of words, use of pauses of expectation and tone variations suggest a natural predisposition to using prosodic resources in both spontaneous conversation and professional communication (Table 3).

The DCOS students' means for words/minute and syllables/minute on a reading task (Table 4) were close to those of the broadcasting students of the Serviço Nacional de Aprendizagem Comercial (SENAC)[26] and UFS radio broadcasters[24]. The association between syllables/minute and diadochokinesis seems to reflect the variation of the point, articulatory mode and sequencing of sounds, the ability of making thoughts flow as words without phonatory hyperfunction or vocal abuse[13].

Students of both sexes showed mean MPTs for the vowel /a/ and s/z ratio within the normal range, corroborating data from a study of future professional voice users[27]. When analyzed individually, the MPT means for the fricatives were inferior to 15 s, which suggests compromised breath support[3,28] and likely influence of the clavicular-thoracic breathing mode. The analysis of the s/z ratio points to the reliability of the measure of glottic efficiency[4] of the communication students (Table 5).

For the students, vocal attack was associated with loudness and pitch. In the female population, the tendency to a soft vocal attack, weak loudness and high pitch may indicate the presence of audible transglottal air[3] contributing to the breathiness signal. Among males, strong loudness and hard vocal attack may occur as a result of glottal closure with the likely predominance of the action of the external thyroarytenoid muscles.

In female students, the association of weak loudness and longer MPTs for fricatives differs from what is found in constant and smaller airflows of MPTs of normal speakers, which suggests that the longer duration of the sustained phonation has a negative impact on sound stability and quality[5], and indicates alterations in phonation stability due to sound breaks an indication of cessation of vocal fold mucosal vibration, vocal signals that predispose to voice disorders[4].

In male students, the low pitch and strong loudness have equivalent proportions to commercial announcements of low pitch and fluent voice[22], with strong loudness being a hallmark of sports broadcasting. Considering the vocal psychodynamic of authority implied in the low-pitched voice and excessive energy for strong loudness[2], those attributes convey an impression of assertiveness to the listener[14] and appear to contribute to a socially valued vocal signature, which is reinforced by the media as a credibility resource (Table 6).

With regard to the perceptual-auditory evaluation (CAPE-V), there were no deviances in the overall impression of dysphonia, pitch, or loudness;

and a mild degree of intermittent signals of roughness, breathiness, and strain, in line with the findings among individuals without voice-related complaints[29]. The data gathered from the communication students point to a variation of normality produced by irregular vibration, audible escape of air and strained speech, which could be made worse by inadequate professional voice usage.

An Australian study addressed the perception of radio employers and elocution educators regarding the communication characteristics of radio broadcasters in the twenty-first century: content, personality; reading and interpretive ability, an easy-on-the-ear voice in the style of the radio station, conversational voice projection of intimate media, messages with a clear diction, not overarticulated, an impact of authority and naturality; a real voice, a signature, even with slight roughness[15].

As a rule, radio broadcasters do not report a need to change their vocal profile to work in the area, in contrast to students who seek improvement since their college years. Care with the voice is not addressed in the education of these professionals. Currently, however, information on voice is provided in some courses, highlighting the importance in professional training of knowledge of vocal health, thus preventing future voice-related problems[30].

Students of the DCSO are concerned about their vocal health and show interest in the SLP perspective to help them identify their competencies and improve them during their education. However, it seems that an optimization of curricular disciplines is necessary in order to address expressiveness or the development of SLP intervention programs that could contribute to the improvement and qualification of professionals in the undergraduate programs (radio and TV and/or journalism).

Conclusion

Students of the Department of Media Communication of the UFS show a positive impact of voice-related quality of life, care for their vocal health, gender-adequate pitch and loudness, glottal efficiency on phonatory measures, and a vertical focus of resonance predisposing to laryngeal hyperfunction, which is likely compensated by the use of prosodic resources. Non-verbal and vocal resources are perceived in their preferred voices, and the verbal resource cited in curricular disciplines.

The data from the DCSO reinforce the importance of focusing on expressiveness integrated with vocal health and training both in the SLP intervention and in the education of the professional in Media Communication undergraduate programs.

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APPENDIX I

UNIVERSIDADE FEDERAL DE SERGIPE
CENTRO DE CIÊNCIAS BIOLÓGICAS E DA SAÙDE-CCBS
COURSE OF SPEECH THERAPY
INTERVIEW SCRIPT SEMISTURCTURES

Name:_____Age____ Date of birth _____
Marital status _____Natural _____ Nationality _____
Adress _____ Phone _____
Course _____ Period _____
Motivation / Main complaint: What motivated interest in Speech Pathology service?
_____
Communication skills () fluency of speech () Understanding and Expression () Hearing () Vocal Quality.

General health: Let's talk about your health!
Made medical consultation? no () Yes () More than one year () less than 1year () Specify
Do you have problems? Specific Treatments performed?
() Allergy () Respiratory () Neurological () Endocrine () Digestive
() Oral () Otologic () pharyngolaryngeal () Fainting () Surgery
specify_____

Lifestyle
Physical activity: _____ Posture _____
Sono: Time_____ Snore_____ Other _____
Food: What do you usually eat? Feel heartburn or other symptoms of reflux?_____
Hydration Water intake: () 1-2 cups / day () more than two cups a day
Other Juices () Soda () Coffee ( ) _____
Alcoholic substances: No () Yes () Every day () one or two times p / week ()
Fermented Beer () wine () champagnhe () other: How much?_____
Distilled Whisk () vodka () rum () brandy () other: How much?_____
Nicotine use drugs () marijuana () cocaine () Other _____
Period Less than one year () 1-3 years () 4-6 years () over 7 years ( ).
Take medicines regularly? What?_____
Analgesic / aspirin () Antibiotics () Nasal sprays () Cough suppressants () Inserts ()
Decongestants () Antidiarrheals () Diuretics () Vitamin C () Tranquilizers ()
Describe the sensations you feel in the throat? What?_____
Shoulders and neck tension () Throat clearing () Dryness () Persistent cough () Itching () Throat scraping () Grip weight or throat () Pressure in the chest or burning Burning () cake (throat) pain and difficulty swallowing () choking () Pain in the neck ()
Describe one realizes vocal. What?_____
Vocal fatigue () Effort to speak () failures voice: () Shortness of breath to talk () Afonia () Voice weak, low and air () Hoarseness () Pain when speaking ()
Vocal use: Talking on Environmental Competition () High Speech () Scream ()
When his voice gets better / worse_____
Hoarseness: for more than fifteen days () Permanent () Progressive ()
Environmental factors: Air conditioning () Thermal shock () Pollution / inhalation ()
Vocal self-image: Positive () Negative () Print agreeable () disagreeable ()
Preferred voice: _____ Expression Recursos _____ Disciplines _____

APPENDIX II

UNIVERSIDADE FEDERAL DE SERGIPE
CENTRO DE CIÊNCIAS BIOLÓGICAS E DA SAÙDE-CCBS
COURSE OF SPEECH THERAPY
EVALUATION OF SCRIPT VOICE SPEECH and FLUENCY

Name: _____ **Age:** _____
Connected speech: name, age, date, numbers 1-20; Days of the week; Months of the year.
Voice excerpt sung: Congratulations Glissando / i /, / u / up and down.
Maximum phonation time (MPT)
/a/ ___/s/ ___/z/___ Ratio s/z_____ MPT numbers 1 a 20 recharge Offers ( )
Diadochokinesis *Pataka, Badaga, Mananha, Fasacha Vazaja* (e,i,o,u)

Types of voices: Fluid hoarse, rough, breathy, strained, childish, nasal.
Resonance: Oral () Nasal () laryngeal-pharyngeal () Balanced ()
Test intermittent nasal occlusion vowel / i / speech: *Pato, tatu, aqui, fofo, saci, chuchu*
Phrases: *O sapo saltou daquela pedra; O gato está em cima do tapete*

Pitch frequency: Acute () Record () Loudness intensity: Strong () Poor ()
Vocal attack: Low () breathy () Brusco () Grade: Low () Moderate () Severe ()
Endurance Test # 100 1-
Breathing mode: Oral () Nasal () oronasal ()
Breathing type: Clavicular () Thoracic () Abdominal () costodiaphragmatic ()
Articulation: Need () not relevant () Locked () Exaggerated ()
CPFA: normal () changed () level: Respiratory () phonation Articulatory ()
Speed: Normal () Low () Increased Rhythm: () regular () irregular
Body evaluation
Gestures: () Excess () Stiffness Vertical Axis: () Straight () support plant
Shoulder girdle: Neck: anterior () a posterior () inclined
Shoulders: anteriorizados () raised () fallen () Chest: expanded () tense () contracted ()
Face: Forehead Eyes Mouth and Jaw. Voltage ()_____
Position of the Larynx: (1) High: against base of the tongue. (2) Low: towards the chest
Maneuver 1 Mid Approximation of wings of the thyroid cartilage.
Maneuver 2 Previous Keystroke larynx "ooo" () severe pitch
Maneuver 3 Keystroke Vertical larynx 'uuu'.
Speech rate - Speech Sample - Informative and Commercial*
"A dengue é responsabilidade de cada um de nós//esvazie garrafas e pneus//coloque areia nos pratos de plantas//cuide do seu quintal/ e da saúde de todos nós////. O restaurante Saborá convida você a conhecer a melhor parmegiana da cidade. Sexta-feira é dia de parmegiana especial no restaurante Saborá, estamos esperando você. Restaurante Saborá, Rua da Quinta, setenta e cinco. Fone: 47793261."
Prosodic features: Emphasis: _____ Tone: _____ Duration: _____

Font: *Faria DM, Camisa MT, Guimarães MA. Muito além do ninho de mafagafos: um guia prático para aprimorar sua comunicação. 2ª. ed. São Paulo: J&H; 2007. Pinho SMR, Pontes PAL. Série desvendando os segredos da voz: Músculos intrínsecos da laringe e dinâmica vocal. Rio de Janeiro: Revinter: 2008. v.1. Pinho SMR. Tópicos em Voz. Rio de Janeiro: Guanabara Koogan; 2001. Behlau M, Pontes, P. Higiene vocal e fatores de risco para a voz. In: Bhelau M, Pontes P. Higiene Vocal: Cuidando da Voz. 4th ed. Rio de Janeiro: Revinter; 2009. p. 23-48.