

Original articles

The use of voice in higher education: What the professors have to say?

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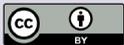
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ABSTRACT

Purpose: to describe the perception of university professors regarding their use of voice at work.

Methods: a total of 247 higher education professors participated in this study. They answered a questionnaire on voice complaints, in which three complaints or more were considered indicative of a voice disorder. After the professors with a potential voice disorder were identified, a conversational interview was conducted with five professors to learn more on their perceptions on the use of voice at work. The study was approved by the research ethics committee of the institution of origin. The data were quantitatively and qualitatively analyzed.

Results: the age group 20 to 30 years old was the one that most presented voice problems. The most recently hired professors (up to five years of work), with a 40-hour weekly workload, were those who most reported voice complaints. The professors had a good perception of their voice and demonstrated good knowledge about it.

Conclusion: although voice complaints were prevalent, the professors proved to be aware of how to take care of their voices.

Keywords: Speech, Language and Hearing Sciences; Voice; Faculty; Occupational Health; Communication

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INTRODUCTION

Occupational voice users are those who depend on their voice to work and are negatively impacted if their voice is changed. In present-day society, approximately one third of the professionals rely on their voice to work¹, including teachers, professors, singers, actors and actresses, clergies, politicians, secretaries, lawyers, health professionals, salespeople, street vendors, and community health agents, just to name a few. However, the professionals who most use their voice to work are teachers and professors¹⁻³.

The voice is particularly important to make possible the teachers' and professors' work. They are expected to project well their voice, with precise articulation, pneumophonoarticulatory coordination, good sonority, and adequate rhythm and speed, thus delivering a proper oral communication^{2,4}.

Dysphonia is considered an important health disorder, with direct consequences not only to health but also to the person's social and professional life. Teachers and professors have two to three times more complaints of dysphonia than other professionals, which evidences that teaching is an occupation with a high risk of this affection^{5,6}.

Occupational voice disorders are normally associated with how teachers and professors use the voice: usually, they increase vocal intensity when they speak for a long time and tension the cervical musculature, most of the time not being attentive to well-being^{7,8}; moreover, the work setting and work-process organization together can be significant factors for voice disorders. This triad – person, work setting, and work organization – was established by consensus for the development of a document that included occupational voice disorders (OVD) in the occupational-related diseases manual².

Voice disorders keep teachers and professors from effectively performing their duties. As a result, they may be recurrently absent from work, ask leaves of absence, or even quit the profession altogether. Hence, they must know their voice, its qualities and limitations, and the outcomes of using it during class⁹⁻¹¹.

The person's awareness of the factors that lead to an unhealthy voice, their knowledge of how the voice works and how to handle it at work, and their vocal habits are especially important. Having no access to information or being unable to put their knowledge about voice into practice due to an inadequate work setting and/or organization can contribute to the onset of voice symptoms^{12,13}.

Most of the studies refer to elementary, middle, and high school teachers as those who most have voice problems. However, few approach university professors. Higher education professors may have somewhat different working conditions when compared with other teaching levels, considering the work setting and organization. Nonetheless, their voice is not free from risks related to the environmental, organizational, and personal factors inherent to their profession¹⁴.

The use of voice in higher education is a pertinent theme, which calls for a reflection on how this category needs to be cautious in their professional use of the voice. This applies particularly to the awareness of the importance of the university professors' self-perception of voice, as they grow conscious of their health and professional performance². Hence, this study's differential is its analysis based on the identification of the most reported voice complaints and the professors' statements – this research's main thread. Given the above, this study aimed to identify the most reported voice symptoms and describe how university professors perceive the use of voice in their work.

METHODS

This was a quantitative, qualitative, descriptive, observational, cross-sectional study. The research was carried out in a public university, counting with the participation of 247 professors working in the university's academic departments.

This research was approved by the Human Research Ethics Committee of the *Universidade Federal de Pernambuco*, PE, Brazil, under protocol number 029245/2015. The data collection took place at two different stages: first, with an online questionnaire sent to all the 2,504 professors of the three campuses. In this stage, the inclusion criterion was to be either a tenured or substitute professor, with or without voice complaints, invited through digital media to participate in the research. The exclusion criteria for this study were the professor's not having an active e-mail and/or not completely answering the questionnaire.

For this stage, the collection instrument used was a questionnaire whose questions are shown in Figure 1. It was developed by the authors and sent online to the professors of the university's academic departments to identify professors with complaints of changes in their voice. A minimum of three complaints was defined as indicative of a potential communication disorder; this cutoff score was based on the study by Sapir¹⁵.

A total of 247 professors answered the questionnaire. Based on this sample, the exclusion criterion for the second stage of the research was the professors who had less than three voice complaints. Since the individuals with three or more such complaints can have some voice disorder¹⁵, these were the relevant ones for this study.

When the researchers sent the questionnaire online to the participants, they also provided all the explanations regarding the study. This included clarifications about the structure of the informed consent form, which was developed in compliance with the norms of the Ethics Committee and then made available on the internet along with the questionnaire. Since it was an electronic questionnaire, its being answered and returned characterized that the participants were informed and consented with it.

The initial questionnaire – in which the professors with a potential voice disorder were identified – were quantitatively analyzed, pointing out the aspects of the voice-related problems reported by the group. Then, they were contacted and invited to participate in the second stage of the research, with an individual interview aimed to investigate how they perceived the use of voice at work. It contained questions regarding voice representation at work and factors that led to voice complaints (including personal, organizational, and environmental aspects of their work).

When contacted, the professors were asked about the best place where they could meet for the interview. Hence, the authors offered to go where the professors proposed. Only five professors agreed to be interviewed, as most did not have time available. The interview was recorded on audio and transcribed, which was used for the analysis along with the notes taken. Since the sample in qualitative studies is not based on numerical criteria, the number of interviews that allowed a certain repetition of information (saturation of the theme) was considered enough. Thus, after the fifth interview, the collection was finished; the theme was being saturated, as the content reported in each professor's interview was being recurrently repeated in every new collection.

The quantitative analysis of the results used descriptive statistics techniques, with tabulated absolute and percentual distributions.

The interviews and the meaning of the statements contained in them were analyzed following Bardin's content analysis method. It organizes the interviewees' statements by thematic categories, based on the central meaning of communication. These, depending on their presence and the frequency in which they appear, can be meaningful for analytical purposes¹⁶. The content analysis method comprises three major phases: 1) Pre-analysis, encompassing the general reading of the material chosen for analysis; 2) Exploration of the material – i.e., the excerpts of the texts approached as recorded units and the definition of rules to count, classify, and organize the information into categories; 3) Treatment and interpretation of the results, which consist in picking up the manifested and latent content of all the material collected.

After reading and rereading the material collected, three categories were established, namely: voice representation, factors leading to voice complaints, and recommendations for healthily using the voice at work. Based on these categories and repeatedly reading the interviews, subcategories became increasingly noticeable. It is important to highlight that the categories were already available to the researcher from previous experience and interests; these are predefined, a priori categories in content analysis. The subcategories, on the other hand, had not been preestablished; they arose from what had been expressed in the professors' words, which is valued in content analysis.

RESULTS

The characteristics of the sample researched are presented in Table 1. Four identification variables are shown in it: age group, gender, time working as a professor, and weekly workload. Most of the study's population were females 20 to 39 years old, having taught at the institution for up to five years, with a 40-hour weekly workload. The professors involved in this research worked in fields related to math, humanities, and health.

As for the characteristics of the professors who agreed to participate in the second stage of the research, four were women and one, man, all of them 40 to 49 years old, with a 40-hour weekly workload.

Table 1. Characteristics of the sample researched

Variable	n	%
TOTAL	247	100,0
Age group (years)		
20 to 39 years old	110	44.53
40 to 49 years old	74	29.95
50 years old or more	63	25.5
Gender		
Males	106	42.91
Females	141	57.08
Time working as a professor		
Up to 5 years	118	47.77
6 to 10 years	64	25.91
11 to 20 years	30	12.14
More than 20 years	35	14.17
Weekly workload		
20 hours	12	4.85
40 hours	235	95.14

The assessments of the self-reported voice symptoms are presented in Table 2, according to the identification variables. This table also shows the percentage of professors who reported more than three voice symptoms (which was characterized as a potential voice problem) and those that reported less than three. The analysis revealed that the age group

with most voice symptoms is 20 to 39 years old and that such symptoms are reported mostly by female professors. Those who most report symptoms had been working as professors for up to five years, as well as those with a 40-hour weekly workload. The percentage of professors participating in the research who reported three or more voice symptoms was 57.89%.

Table 2. Voice symptoms, according to the identification variables

Variable	Voice symptoms				TOTAL	
	Three or more symptoms		Less than three symptoms		n	%
	N	%	N	%		
Total group	143	57.89	104	42.10	247	100.0
Age group (years)						
20 to 39 years old	65	59.09	45	40.90	110	100.0
40 to 49 years old	45	60.81	29	39.18	74	100.0
50 years old or more	33	52.38	30	47.61	63	100.0
Gender						
Males	54	50.94	52	49.05	106	100.0
Females	89	63.12	52	36.87	141	100.0
Time working as a professor						
Up to 5 years	66	55.93	52	44.06	118	100.0
6 to 10 years	38	59.37	26	40.62	64	100.0
11 to 20 years	18	60.0	12	40.00	30	100.0
More than 20 years	21	60.0	14	40.0	35	100.0
Weekly workload						
20 hours	5	41.66	7	58.33	12	100.0
40 hours	138	58.7	97	41.27	235	100.0

The voice symptoms reported by the professors are presented in Figure 1. The most recurrent complaint was the discomfort felt when speaking for a long time (67.13%). The second most mentioned complaint was the unawareness of how to protect their voice (63.63%). Also, 45.45% of the professors reported having

perceived changes in their voice, with complaints such as hoarse and/or weak voice, and/or effort to speak, and/or voice cracks. The least reported complaint was of people mentioning that the professor's voice was hoarse (6.99%).

Voice symptoms	n	%
My voice gives me a hard time at work	28	19.58
The noise at the work setting interferes with my oral communication	39	27.27
My voice feels uncomfortable when I speak for a long time	96	67.13
My voice changes throughout the day	38	26.57
I notice changes in my voice, such as hoarseness, weakness, effort to speak, and/or voice cracks	65	45.45
I feel pain, phlegm and/or a globus sensation when I use my voice	32	22.37
I feel my voice tired when I speak	41	28.67
I do not know how to care for my voice	91	63.63
I speak too much at work and it harms my voice	53	37.06
People say my voice sounds hoarse	10	6.99
I have a hard time performing my duties at work because of my voice	16	11.18
I sometimes get distressed because of my voice	15	10.48

Figure 1. Frequency of the voice symptoms

Regarding the professors who participated in the second stage of the research, the self-reported voice complaints that stood out were voice discomfort due to long periods speaking and changes in the voice, with complaints such as hoarse and/or weak voice, and/or effort to speak, and/or voice cracks.

The professors' perceptions regarding voice representation are presented in Figure 2. Three subcategories – communication, professional activity, and interaction with the students – arose from the analysis of the reports. In the communication subcategory, most of the interviewees reported that the voice is the means of communicating with other people: “The voice

is indispensable for me because that is how I express myself... It is a means of reaching out to the other people” (P2). In the professional activity subcategory, the professors reported that the voice is important because it is what they use to work with, the common aspect in their statements: “The voice is one of the main resources we have for our work... It is with my voice that I work as a professor” (P1). In the interaction with the students subcategory, the professors reported that it was with the voice that they managed to communicate with the student: “The voice for me is the main means of communication with my student, to expose my ideas” (P4).

Communication	Professional activity	Interaction with the students
<p><i>"The voice is a means of communication, of expressing feelings, our way of being, of feeling..." (P3)</i></p> <p><i>"It is part of our identity, it is very important for communication... an important means of communicating and interacting, of learning, and interacting in different aspects, right?" (P5)</i></p> <p><i>"The voice is indispensable to me because it is how I express myself... It is a means of reaching out to other people" (P2)</i></p>	<p><i>"The voice has greater importance in my life because it is associated with my career, which is research; so, the voice is what I work with..." (P4)</i></p> <p><i>"The voice is one of the main instruments one has to work with... It is with the voice that I work as a professor". (P1)</i></p> <p><i>"The means for me to work with... The voice is how I develop, how I can develop my work..." (P3)</i></p>	<p><i>"The voice is the means of communication with the student..." (P3)</i></p> <p><i>"It is essential because it is through the voice, through oral verbal language, that we interact with the students and mediate the learning process..." (P5)</i></p> <p><i>"The voice to me is the main means of communicating with my students, of exposing my ideas..." (P4)</i></p>

Figure 2. Participants' voice representation

In Figure 3, regarding the professors' perceptions concerning factors that lead to voice complaints, three subcategories were identified in their speech, namely: environmental, organizational, and personal factors. The environmental factors that stood out in their statements were the temperature and noise in the room, which was commonly mentioned by them: "The work setting is inhospitable, too hot, too large, too noisy; so I have to use my voice at maximum intensity all the

time..." (P1). In the organizational factors, the excessive number of students and the lack of rest due to consecutive classes stood out: "The number of students, this is also a determining factor that I notice that changes how my voice behaves..." (P3). In the personal factors, aspects such as the inadequate use of the voice and allergies (flu, rhinitis) stood out: "I sometimes get the flu, lose my voice, and then laryngitis affects me..." (P2).

Environmental factors	Organizational factors	Personal factors
<p><i>"The work setting is inhospitable, too hot; the environments are too large, too noisy; so, I have to use my voice always at maximum intensity..." (P1)</i></p> <p><i>"The work setting is not always clean, so I suffer a lot; as I am allergic, I suffer a lot with the dust in the classrooms, in my office, in the labs... Another thing that harms me is noise. I don't know if the rooms have adequate acoustic isolation; so, there is too much external noise coming into the classroom, so I have to raise my voice. That is something that bothers me, and I take notice of" (P2)</i></p> <p><i>"An air conditioner that makes too much noise, then you have to kind of compete with it, you know, the electronic device, you have to try to speak louder than that noise..." (P4)</i></p>	<p><i>"The number of students, right? That is also a factor that changes, that I feel that changes how my voice behaves..." (P3)</i></p> <p><i>"I think the way the curriculum of the courses I teach is structured; it improved since last year, but there have been semesters when I taught ten consecutive classes, with almost no break for lunch; and this overloads the voice..." (P1)</i></p>	<p><i>"We lack the training to use voice the best way possible..." (P1)</i></p> <p><i>"My occupation as a professor makes me speak even louder and for longer, so this makes me suffer a little, my voice suffers a little because of this, I don't know, voice timbre..." (P2)</i></p> <p><i>"I sometimes get the flu, lose my voice, and then laryngitis affects me..." (P2)</i></p> <p><i>"I associate this hoarseness with the inadequate use of voice, that is, speaking for hours without intoning it right, without the right pauses, without properly hydrating the vocal cords..." (P4)</i></p>

Figure 3. Factors leading to voice complaints

The professors' perceptions regarding recommendations for healthily using the voice at work are shown in Figure 4. Based on their statements, three subcategories were identified: environmental, organizational, and personal factors. In the environmental factors, the highlights are the unnecessary use of air conditioning during class and the comfortable environments: "Not being necessary to use the air conditioning, which is noisy, distorts the voice and makes it tired..." (P3); "Work settings should be more comfortable, more pleasant... The professors who teach in these large rooms should be supplied with mechanical devices

to aid them in teaching..." (P1). In the organizational factors, breaks for resting stood out, as well as class methodologies not requiring long expositions: "Less intense class periods, with longer breaks for the voice to rest..." (P1); "The type of class, you know; I propose many oral discussions, but many activities as well; so I mix both in the class, instead of making it a class in which only the professor speaks..." (P5). In the personal factors, drinking water and monitoring vocal intensity was highlighted: "I spend all day long teaching, and I keep my bottle of water with me... I exercise every day... I've been trying to lower my voice as I speak..." (P2).

Environmental factors	Organizational factors	Personal factors
<p>"Not being necessary to use the air conditioner, which is noisy and distorts the voice, right, and makes it tired..." (P3)</p> <p>"The work settings should be more comfortable, more pleasant... The professors who teach in these large rooms should be supplied with mechanical devices to help them teach..." (P1)</p> <p>"I turn off the air conditioner to try to lower my voice, you know..." (P2)</p>	<p>"The small number of students makes it possible to develop speech with more quality... Having breaks, you can have a break and give the voice some rest..." (P3)</p> <p>"Less intense class periods, with longer breaks for the voice to rest..." (P1)</p> <p>"The type of class, right; I have many oral discussions, but some activities as well, so I mix both in my class, you know, so it is not a class in which only the professor speaks..." (P5)</p>	<p>"Constantly hydrating the vocal cords, right?... The body posture also makes a difference..." (P4)</p> <p>"I spend all day long giving classes and I take my bottle of water with me... I exercise every day... I've been trying to lower my voice..." (P2)</p> <p>"Always taking a bottle of water with me, you know, to drink during class..." (P5)</p>

Figure 4. Recommendations for healthily using the voice at work

DISCUSSION

Changes in voice quality may be related to various factors, such as the irregular vibration of the vocal folds, adduction or abduction problems, the flexibility of the mucosa, or tension of the intrinsic and extrinsic musculature of the larynx. The coordinated work of the larynx and vocal tract and the combination of these with inadequate adjustments are present in individuals with voice complaints and at risk of developing voice changes¹⁷. The high percentage of professors with voice complaints in this study (Table 2) corroborates the result of other studies^{1,17,18}.

The data obtained in this research reveal more often voice complaints in female professors aged 20 to 39 years. The literature points out that, as one grows older, the efficiency of their voice decreases, and a series of structural changes may take place in the larynx, with a greater or smaller impact on their voice¹⁹.

However, this study's population reveals the opposite: the younger professors reported more complaints. This can be justified by their unawareness of voice issues in comparison to more experienced professors. The predominance of women in university faculty in this research confirms the findings of other studies^{20,21}.

Such a predominance is explained by the broadening of the educational system, which started in Brazil in the mid-20th century. It considered teaching as a women's activity as it encompassed caring for others and was seen as a continuation of domestic activities¹.

Furthermore, females are considered more vulnerable to developing voice disorders when compared with males because of anatomic-physiological reasons. The female larynx characteristically has a posterior triangular fold and lower glottal proportion, making them more prone to the onset of voice changes. Besides these aspects, females have less hyaluronic acid on the surface of the vocal folds, which hinders

their recovery from traumas. It is important to highlight that women attend health services more often than men, which can also be included in the justification of the women's having more voice symptoms^{17,22,23}.

A study conducted with 88 middle and high school teachers analyzed voice symptoms and lifestyle factors. It found that 64.77% of the interviewees self-reported voice changes. Moreover, the literature reports that the voice problems appear after long years in the profession²⁴ – which differs from the present study, whose finding was the opposite, as the professors with less time in the profession were the ones that most reported voice complaints.

The older and more experienced professors may have learned about vocal hygiene and become aware of their own voice, which might have helped them, in contrast with their younger and less experienced counterparts²⁵. This can justify the findings in this study, as the population that most reported voice complaints in this research was the one who had been teaching for less time. It is essential to clarify that this is a limited comparison of studies because the present one analyzes higher education.

The workload is normally of great importance for the perception of a professors' working conditions. They are associated with both the poor quality of life and the presence of pathologies. In this study, the professors who most reported voice problems were those with the heaviest workloads. Hence, it confirms what is said in the literature and shows that indeed it is an issue that needs to be addressed in health promotion public policies for the professors^{1,17,19,20}.

The professors' self-report of voice symptoms (Figure 1) shows that approximately 67.13% of them mentioned discomfort when speaking for long. This is due to the great demand for their voice, which in turn leads to incorrect use of the voice, especially in activities that require great effort, potentially resulting in a negative voice symptom^{1,19}.

Other voice problems (Figure 1) reported by the professors were related to unawareness of how to use the voice, modifications in the voice throughout the day, hoarseness, weak voice, effort to speak, and fatigue when speaking. The symptoms reported by the subjects are compatible with those described in the literature that verified such complaints in professors^{22,26}. These symptoms reflect the combination of various factors related to the working conditions and the professors' perception of the exposure to

the environment and workload, which can cause voice symptoms and eventually dysphonia¹.

The self-perception of voice and of factors that cause voice disorders is very important, whereas these professionals' unawareness regarding the voice make them little careful with it while, at the same time, they do not seek for help^{13,27}. In this context, the interviews with some professors enabled their perception to be understood regarding voice representation, factors leading to voice complaints, and recommendations regarding the use of voice.

For the professors, the voice is important because it is what they use to communicate and interact with other people, besides being what they work with. Knowing about their voice and its importance as a teaching resource is greatly relevant for academic life, as shown in research that approached this theme^{4,13}. Nevertheless, it is common to see studies revealing these professionals' lack of knowledge about the voice, which makes them little careful with it^{3,28}.

For part of the professors interviewed, the work setting (Figure 3) is noisy, dirty, and with an inadequate temperature. The intense noise most of the time forces them to raise the voice to communicate, potentially causing important changes, such as dysphonia^{29,30}. The inadequate temperature and the dust present in the room are factors that bother the professors; these circumstances have been investigated by speech-language-hearing pathologists for some time^{20,31,32}.

The literature shows that the cause of dysphonia is multifactorial²⁸; the work organization in some ways can contribute to its onset. Regarding the organizational factors that lead to voice complaints, the professors reported the large number of students and the lack of breaks in between classes as the most unsatisfactory factors. The professors' self-report in this research is confirmed in the literature, which shows that the number of students and the lack of rest are directly related to the educators' dysphonia and poor quality of life. Nevertheless, it should be highlighted that the activities of public university professors are not exclusively related to teaching; they have other duties that do not require their voice as much¹⁹.

The professors' statements regarding personal factors that lead to voice complaints highlight aspects such as allergies and the unawareness about how to use the voice. That these can influence the onset of voice complaints is confirmed by the literature^{3,13,28}.

The professors participating in this study made many comments regarding the healthy use of voice at

work. Among the aspects mentioned, they highlighted not using the air conditioner, having comfortable environments, having breaks to rest their voice, not planning expositive-only classes, drinking water, and monitoring their voice intensity. These aspects contradict what they had said about not knowing how to use their voice properly – it shows indeed a brief understanding of the factors related to the healthy use of voice. Also, it confirms research equally involving university professors, which identified that these professionals have a perception of how they should care for their voice and how to handle it at work¹³.

This research shows that the population studied reports a high percentage of voice complaints and has good voice perception. This indicates that the main measures to improve the working conditions of the professors investigated are related to the work setting and organization. However, it is expected that programs be developed to make this category more aware of their voice, as a good part of them stated not knowing much about it. This is particularly important given that for the professor the voice is their means of communication and needs to be in good condition for them to carry out their duties^{3,28,29}.

CONCLUSION

In this study, many reports of voice symptoms were observed in higher education professors. The professors' testimonies revealed that they know how to take care of their voice and are aware of what happens with it. For them, the work setting and organization can lead to an unhealthy voice. Hence, they demonstrate that they have a good perception of the factors that cause voice complaints.

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