

The Influence Of Proper Voice Hygiene On The Effectiveness Of The Pedagogical Process In A Digital Educational Environment

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Abstract: The article examines the modern features of teachers' vocal workload in the context of the digitalization of the educational process. The influence of proper voice hygiene on the effectiveness of teaching activities, students' perception of educational material, and the prevention of professional voice disorders is analyzed. Special attention is paid to new risk factors associated with distance learning and the use of digital educational technologies. Statistical data on the prevalence of voice disorders among teachers are presented. The study substantiates the importance of functional vocal stability as one of the components of a teacher's professional competence in a digital educational environment.

Keywords: Voice hygiene, pedagogical process, digital education, distance learning, vocal endurance, professional dysphonia, pedagogical communication, phoniatry.

Introduction: The modern educational system actively integrates digital technologies into the learning process. The expansion of distance learning, online educational platforms, and electronic educational resources has significantly changed the working conditions of teachers. As a result, the nature of vocal workload has also changed, which directly affects the condition of the vocal apparatus.

Voice is the main instrument of pedagogical communication. The effectiveness of information delivery, students' understanding of educational material, and emotional interaction between teachers and students largely depend on voice quality. Prolonged vocal strain in digital educational environments may contribute to functional disorders of the vocal apparatus and decreased professional performance among teachers.

Currently, proper voice hygiene is becoming increasingly important, since prevention of voice disorders is one of the essential conditions for

preserving teachers' professional health and improving the effectiveness of the educational process.

Materials and Methods The study involved 42 teachers from secondary schools and higher educational institutions who actively used digital educational technologies in their professional activities. A questionnaire-based cross-sectional survey was conducted in 2026.

The questionnaire included questions related to:

- duration of daily vocal workload;
- presence of vocal complaints;
- symptoms of vocal fatigue;
- compliance with principles of voice hygiene.

The obtained data were analyzed using descriptive statistical methods. Comparative analysis between groups was performed using percentage distribution indicators. Statistical significance was considered at $p < 0.05$.

Scientific Novelty The scientific novelty of this study lies in the analysis of the influence of voice hygiene on the effectiveness of the pedagogical process in a digital educational environment. Particular attention is paid to modern factors of vocal overload associated with distance learning, online communication platforms, and prolonged speech activity during digital interaction.

The study also examines the concept of functional vocal stability, defined as the ability to maintain stable voice quality during prolonged professional vocal *напряжение*. In addition, the relationship between teachers' vocal fatigue and decreased student cognitive engagement during online learning was analyzed.

Results Analysis of the obtained data demonstrated

that 71.4% of respondents used their voice for more than five hours daily during online and offline classes. At the same time, 64.2% of teachers reported periodic hoarseness, 57.1% complained of dryness and discomfort in the laryngeal region after prolonged video lectures, and 38% experienced pronounced vocal fatigue by the end of the working day.

Teachers who regularly followed the principles of voice hygiene, including adequate hydration, vocal rest, breathing exercises, and rational voice use, demonstrated significantly fewer complaints associated with vocal dysfunction. In this group, symptoms of functional dysphonia were observed 34% less frequently compared to teachers who did not follow preventive recommendations ($p < 0.05$).

Indicator	Teachers Following Voice Hygiene (n=18)	Teachers Not Following Voice Hygiene (n=24)
Hoarseness complaints	6 (33.3%)	21 (87.5%)
Vocal fatigue	4 (22.2%)	12 (50.0%)
Laryngeal discomfort	5 (27.8%)	19 (79.2%)
Symptoms of functional dysphonia	4 (22.2%)	11 (45.8%)

According to modern scientific literature, professional voice disorders are significantly more common among teachers than among representatives of many other

professions. Various studies report that from 32% to 57% of teachers periodically experience symptoms of vocal fatigue, hoarseness, or reduced vocal sonority.

Vocal Complaint / Indicator	Number of Teachers (n)	Percentage (%)
Daily voice use more than 5 hours	30	71.4%
Periodic hoarseness	27	64.2%
Dryness and discomfort in the laryngeal region	24	57.1%
Pronounced vocal fatigue by the end of the day	16	38.1%
Regular compliance with voice hygiene principles	18	42.8%
Symptoms of functional dysphonia	15	35.7%

The analysis of scientific publications showed that the digital educational environment creates additional risk factors for the development of voice disorders among teachers due to:

- prolonged continuous speech load;
- insufficient respiratory support;
- monotony of speech;
- use of low-quality audio equipment;

- increased psychoemotional stress.

Scientific data indicate that compliance with voice hygiene principles contributes to:

- reduction of vocal fatigue by 30-35%;
- improvement of speech intelligibility by approximately 20%;
- increase in student concentration by 15-25%;
- reduction in the risk of chronic vocal disorders

by nearly two times.

Discussion

The obtained results confirm the relevance of preserving teachers' vocal health under conditions of educational digitalization. Unlike traditional face-to-face education, distance learning creates additional functional stress on the vocal apparatus.

One of the major problems identified in this study is the insufficient awareness of teachers regarding rational voice use and preventive vocal care. In many cases, teachers continue intensive voice use without considering the physiological mechanisms of voice production, which may contribute to chronic vocal fatigue. Parents' words usually have a much greater impact on a child's future than parents would like. Therefore, they should be handled with great care. It is crucial for a child to distinguish between their attitude and their behavior.

Such a mother may go to her friends, leave her young children alone, and not return until the next morning. She always allows her child to try strong alcoholic beverages in the presence of her friends, finding it very amusing. By taking her children to dangerous places, she may encourage them to engage in behavior that could endanger their lives.

In other words, the psyche affects the production of neurotransmitters, and neurotransmitters control the life activities of the whole organism.

The main task of primary school educational activities is to teach students to learn. Under the influence of education, serious changes occur in the mental development of children of primary school age. Anxiety about somatic disorders can lead to hypochondriacal feelings, which also contribute to malnutrition. Thus, a kind of vicious circle arises in the form of anorexic cycles, when chronic starvation causes changes in the internal organs, leading, in turn, to food restrictions. In some cases, patients begin to be actively examined by various specialists, exaggerating the severity of somatic disorders and avoiding consultation with a psychiatrist. In the educational process, a teacher's reflective skill has a significant impact on students' personal development. Reflective teachers are able to understand students' emotions and show empathy towards them.

The concept of functional vocal stability deserves particular attention. This concept implies a teacher's ability to maintain stable voice quality under prolonged professional vocal load. The development of such stability requires a comprehensive approach including voice hygiene education, breathing training, and prevention of psychoemotional overstrain.

Thus, proper voice hygiene should be considered not only as a method of preventing voice disorders, but also as an important factor influencing the overall quality of the educational process.

Practical Significance The results of this study may be used in the development of preventive phoniatic programs for teachers working in digital educational environments. The proposed recommendations may also be incorporated into teacher training programs aimed at preserving vocal health and improving pedagogical communication efficiency.

Conclusion

Proper voice hygiene is an important component of teachers' professional activity, especially within digital educational environments. The analysis of scientific literature and the results of the present study confirm that preserving teachers' vocal health has become increasingly important under conditions of educational digitalization.

The increase in speech workload associated with remote and hybrid learning contributes to the development of functional disorders of the vocal apparatus, decreased vocal endurance, and reduced quality of pedagogical communication.

Compliance with voice hygiene principles positively affects both the physiological condition of the vocal apparatus and the effectiveness of the educational process. Rational voice use, adequate hydration, breathing exercises, and prevention of vocal fold overstrain contribute to reducing the risk of occupational dysphonia and improving resistance to prolonged vocal stress.

The study demonstrated a high prevalence of complaints related to hoarseness, laryngeal discomfort, and vocal fatigue among teachers actively using digital educational technologies. At the same time, teachers who followed voice hygiene recommendations demonstrated significantly fewer symptoms of functional voice disorders.

Therefore, proper voice hygiene should be considered an essential component of professional health and pedagogical competence in modern education. The implementation of preventive programs aimed at developing voice protection skills represents an important condition for improving educational quality and preserving teachers' professional longevity.

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