



# Using Games as a Medium for Voice Hygiene Education

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## Background

Occupational voice users are at increased risk for voice disorders based on job-related vocal demands (Titze, Lemke, & Montequin, 1997). Currently, there is conflicting evidence on the effectiveness of voice hygiene education for preventing voice disorders (Nanjundeswaran et al., 2012). Typically, these studies have included education sessions and/or voice therapy.

Games have been described as “powerful tools for learning” (Grieshop, 1987) and therefore may be an appropriate medium for teaching voice hygiene. There is a paucity of literature in this area as only one known study has investigated a mobile health game for testing vocal health and vocal hygiene knowledge (Roza, Gielow, Vaiano, Behlau, 2019), **but no known studies have investigated whether games are an appropriate medium for teaching voice hygiene information.**

## Purpose

The purpose of the current study is twofold. First, this study assessed whether playing games led to improvements in voice hygiene. Second, this study provided preliminary evidence for the best types of games for presenting general voice and voice hygiene education information.

## Methods

This study was approved by the University of Northern Iowa Institutional Review Board.

### Game Creation

As an assignment in the graduate Disorders of Voice course in Fall 2019, students worked in groups to create games to teach the UNI community about the voice and voice hygiene. For the assignment, the students had to combine the following in the design of their game:

- At least one game design principle from an article outlining video gaming principles with applications to speech therapy (Table 1; Folkins, Brackenbury, Krause, & Haviland, 2016)

Gaming Principle	Brief Description
Essential Experience	A consistent theme flows throughout the game to immerse the player in the game experience
Discovery	The player is allowed to experiment and explore in order to achieve success rather than being told how to succeed
Risk Taking	Providing players with challenges appropriate for their skill level that motivate further growth and achievement
Generalization	Skills learned early are usable and can be built upon later in a game
Reward System	Consists of both extrinsic (point systems) and intrinsic (enjoyment) rewards that increase engagement
Identity	Players identify with their character within a game, leading to perspective taking and empathy development

**Table 1: Number of Game Types.**

- One topic related to voice and voice hygiene education (Table 2)

Voice Education Topics	Voice Hygiene Topics
Laryngeal cartilages & intrinsic muscles	Increase hydration
Five layers of the true vocal folds	Decrease caffeine/alcohol
Three mass model of vocal fold vibration	Decrease coughing/throat clearing
Basic inspiration and expiration	Reflux suggestions
Lung volumes and capacities	No smoking
Vocal fold innervation	Medication side effects
	Reduce loud talking/use microphone
	Reduce talking too much/take vocal naps

**Table 2: Possible game topics.**

### Game Creation (Continued)

Table 3 contains a breakdown of the types of games that were created as part of the class project.

Game Type	Number of Games	
	Hygiene	Education
Board	4	0
Card	1	0
Trivia	1	3
Other	1	2

**Table 3: Game Types Created.**

### Game Event

A 3-hour event was held on the UNI campus during the fall semester for the students to showcase their games and provide information to the UNI community about the voice, voice hygiene, and resources available in our in-house clinic. In the first hour, students from the morning class had their games available for attendees to play (5 games). In the second hour, students and the faculty member (Dr. Kopf) discussed parts of a voice evaluation and resources available at our in-house clinic. During the third hour, students from the afternoon class had their games available for attendees to play (7 games).

### Participants

All event attendees were asked if they were interested in participating in a short paper survey as well as an online follow-up survey three months after the event. Of those who attended the event, 11 (8F, 3M; mean age: 40 years) agreed to participate in the initial survey. Participants needed to meet the following inclusion criteria: 1) be 18 years or older and 2) be a member of the UNI community (student, faculty, staff).

### Survey

The voice hygiene questions for the survey were taken from the Behavioral Inventory from Pomaville, Tekerlek, & Radford (2019). These questions were asked again in the follow-up survey. In addition, Table 4 includes questions that were added as feedback about the games themselves in the initial survey.

Question	Question Text
1*	Which game(s) did you find the most helpful/useful to you?
2	Why was/were the game(s) helpful/useful?
3*	Which game(s) was/were the most fun to play?
4	What other information would be helpful to include in the future about the voice/voice hygiene?

**Table 4: Survey questions related to the event.**

**\*Only these questions will be discussed in the poster.**

## Results

Of the 11 participants who completed the initial survey, six completed the follow-up survey (55%).

### Voice Hygiene Questions

For this poster, the results from questions 35, 36, and 37 of the Behavioral Inventory are reported below:

**Question 35:** If you feel like you need to cough or clear your throat, how do you typically react?

**Initial Survey:** 9/11 participants reported they “cough or clear my throat until the sensation goes away.” The other participants responded with “produce a silent cough” or “swallow hard.”

**Follow-Up Survey:** 3/6 participants reported they “cough or clear my throat until the sensation goes away.” The other participants responded with “sip some water.”

**Question 36:** If you experience a hoarse voice or vocal fatigue, how do you typically react? Choose all that apply (14 good hygiene choices, including “increase my fluid intake” and “use a humidifier”).

**Initial Survey:** For the 11 participants, there was an average of **3.5** things they reported doing

**Follow-up Survey:** For the 6 participants, there was an average of **4.8** things they reported doing

## Results (Continued)

**Question 37:** The following are ranked on a Likert rating scale: (5) more than twice a day, (4) 1 to 2 times per day, (3) 1 to 5 times a week, (2) less than once a week, (1) never. Table 5 shows the average values for each question (initial survey 11 participants, follow-up survey 6 participants.)

How often do you:	Initial Survey	Follow-Up Survey
Cough or clear your throat?	3.5	3.8
Yell or shout?	2.8	2.3
Speak loudly or for an excessive period (longer than an hour)?	2.7	2.2
Experience heartburn or tightness in your chest?	1.6	1.3
Feel tension in your throat or like there is a “lump in your throat”?	1.8	2.2
Feel like your singing/voicing is effortful?	1.8	1.8
Lose your voice?	1.5	1.3
Experience pain in your throat?	1.6	1.5
Complete “warm ups” or vocal exercises?	1.3	1

**Table 5: Frequency of vocal habits. A decrease over time indicates improvement in vocal hygiene.**

### Event-Related Questions

The answers for questions 4 & 6 can be seen in Table 6. One of the most interesting results is that despite similar game type counts for most helpful and most fun, the games named in each category were the same half the time and different half the time. For example, a participant may have named one board game as the most helpful but another board game as the most fun.

Game Type	Number of Games	
	Most Helpful	Most Fun
Board	8	8
Card	0	0
Trivia	1	2
Other	3	3

**Table 6: The most helpful and most fun games for learning about the voice and voice hygiene.**

## Discussion

- Overall, questions 35-37 demonstrated improvements in voice hygiene after the event.
- The results of this study indicate that games are a promising medium for voice hygiene education, but further exploration is needed.
- The results of this study indicate that board games are both the most helpful and most fun for players in learning about the voice and voice hygiene.

### Limitations

- There was a small number of participants in this study. There were a number of potential contributing factors to this, such as event location, time of year (November), and time of day (prime class time). These will be reassessed for future iterations of this event.
- Another limitation was the distribution of games. Because students chose the content and type of game, these pairings were not systematic. Future studies may want to look at this more systematically to determine if certain aspects of voice hygiene or general voice education may pair better with different types of games.

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## References

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