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Talk & Play: a VR Application to Improve Volume and Silences Use in Verbal Communication

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Abstract: Public speaking is present everywhere in our lives; therefore, it is important to know how to do it correctly. Most people have difficulties speaking in public due to their glossophobia (fear of speaking in public). Practicing is one of the best ways for treating this fear and improving the oratory skills.
There are three basic aspects in this discipline which are not always taken into consideration when trying to get better in public speaking: silences, speed and volume. This paper presents Talk&Play, an application for teaching how to use these aspects correctly in a speech and the importance of them.
For validating this application, an experiment for evaluating it is presented as well. Three main conclusions were reached: 1) Talk&Play increases user's self-security during public speaking, 2) it also raises awareness of the importance of a correct use of silences, volume and speed in the experiment participants, 3) User learns how to use volume and silences, but the application still needs to improve.

Keywords: public speaking, virtual reality, educational videogames

1. Introduction

Public speaking has a lot of presence in our daily lives, not only when a speech is done in a congress or in an award collecting, but also in class when asking questions to the teacher, meeting new people, doing a job interview, expressing an idea in a meeting, etc. (Pratiwi et al. 2018). Having a good oratory gives the opportunity of influencing people's behavior and attracting their attention more easily (Angraini 2016). Due to it, it is very important to firmly acquire this skill, but most people (75% of world's population) have difficulties because of their glossophobia (or fear of speaking in public), one of the most anxiety related phobias (Forsythe 2013) (Tse 2005). To overcome this situation, the best option is to practice and learn how to do it correctly. Also, some studies ensure Virtual Reality helps to reduce public speaking anxiety (Lim, Aryadoust, and Esposito 2022) (Noor Farah Wan Shamsuddin, Nur Adilin Mohd Anuardi, and Syafinaz Mohmad Rozee 2022) (North, North, and Coble 1998).

Speaking in public involves many aspects to take into consideration: hand gestures, body position, face gesticulation, eye contact with the public, volume of the voice, talking speed, speech content, etc. (Chance and Luck 1975). In the literature review, we found different methods and tools created for overcoming glossophobia and for oratory improving. Some of the virtual reality videogames are focused on improvisation and creativity (Fuertes Franco, Navarro Vaquero, and Montes Larrabaster 2020), measure sonority, emotions, hands movements and visual contact (Algaba Aranda et al. 2019), lets practice a speech in front of avatars with different moods (Jos, Franco, and Pais 2017), a virtual reality system which keeps tract of the heart rate (Khurpade et al. 2020) or a virtual reality public which is emotions-responsive (El-Yamri et al. 2019).

However, when practicing oratory, the focus is usually not on the voice volume used, talking speed or silences made during the speech but in the rest of the other aspects we have mentioned before. These three aspects are very important because they can make the different between letting the public understand the expressed information or not. Attracting public's attention is one of the main points in public speaking. If the public does not understand what it is being said, is not possible it keeps concentrated on the speech. Nevertheless, we could not find any tool focused on the correct use of voice volume and silences in a speech, despite their importance in oratory.

In this paper we present our tool Talk&Play, a virtual reality game designed and developed to improve these two aspects of public speaking with a preliminary evaluation of it. This paper is structured as follows. This section presents the importance of public speaking. Section 2 describes the application we have created. Section 3 expounds the conducted experiment for knowing if the application can teach the user about the correct use of silences and volume. Finally, Section 4 shows the results and future work.

2. Tool design

Talk&Play consists in a virtual reality videogame for teaching the correct use of voice volume, speed and silences in a speech. As well, it raises awareness on the importance of these three aspects.

We used gamification to take advantage of its motivational, attractiveness and learning related beneficial powers (Díaz and Troyano 2013). On the other hand, virtual reality environments are highly immersive, what allows the user to focus only on public speaking, the feedback received and trying to improve.

The Talk&Play experience starts putting on the headset. A start menu for selecting one of the three minigames appears. It is divided into three minigames because this allows the user to improve each aspect on its own and to practice them all together (See Figure 1). This way, the learning experience is as complete as possible.

The silences minigame teaches the importance, use and correct durations of them (indirectly including the talking speed). In the first level, the correct placement of the silences is indicated and an audio example is given. The second level only keeps the audio example as help. In the third level, the user must be able to do it without any help (See Figure 2). The number of silences needed and their durations is always given. During the game, the number of silences the user does during the speech are checked. They are counted as correct silences if their duration and placements are the desired ones. This is done with phrase recognition. The game penalizes if the user does spare silences or skips any. At the end, the user receives some points and feedback.

The volume minigame teaches the importance and correct use of the volume in different sizes scenarios. In the first level, the user must talk for a small scenario, in the second level for a medium scenario and in the third level for a big scenario. The size is indicated with the approximate number of rows the cinema would have. During the game, the volume the user is speaking at is detected. If it is the desired one, it is considered as correct. At the end, the user receives some feedback.

The practice minigame allows to practice silences and volume together. During the game, the game checks silences and volume and evaluates the user in the same way the third silences level and second volume level do.

During the game, the player can find itself constantly changing between four different phases. In the first phase, the user decides the minigame and level to play. The second phase consists in learning how to use the volume and silences correctly and being able to practice it in a speech by their own. In the third phase, the player can present the prepared speech being monitored by the game. Feedback is shown on the go so the user can rectify its errors before the end. Finally, in the fourth phase, the system gives the results and the feedback to the users.

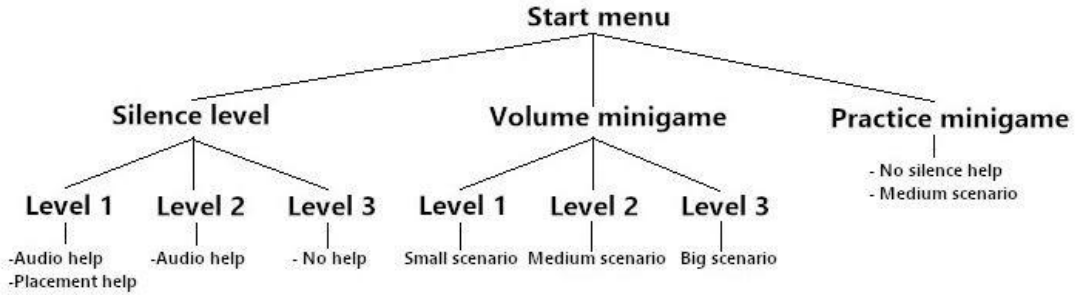

Figure 1. Talk&Play scene scheme.

The feedback received in phase three consists of the detected number of silences and if the used volume is between the asked thresholds, both in real time. The one in third phase, focuses on the whole presentation for stimulating the user to improve its final grade. Receiving two types of feedback keeps the user constantly informed about the course of the game. This helps to avoid frustration due to not understanding the game, (Díaz and Troyano 2013) and to teach the user how to do it better.

3. Experiment

The aim of this experiment was to test our application effectiveness in improving users 'verbal communication. Nevertheless, it is only a preliminary experiment.

3.1 Participants

Fourteen people between 20 and 30 years old participated in this experiment. 64.3% were men, 21.4% were women, 7.1% were gender fluid and 7.1% did not want to answer. All of them were studying or have finished university studies. Both, their initial self-security while talking in public and their videogames relation, covers the whole range (from very confident to not confident at all and from any relation to usual player). They were volunteers reached randomly between university community. Their role was to try the application and answer some questionaries about their public speaking and videogames related feelings and its perspective of the aid the application gave them.

3.2 Experimental design

The experiment consisted of making a first test with the application and collecting information about the participants and the application's behavior. For this, we asked fourteen people to participate, and we organized fourteen small intervals of 30 minutes each. Each interval was divided into 3 parts: part 1, part 2, and part 3 (See figure 3).

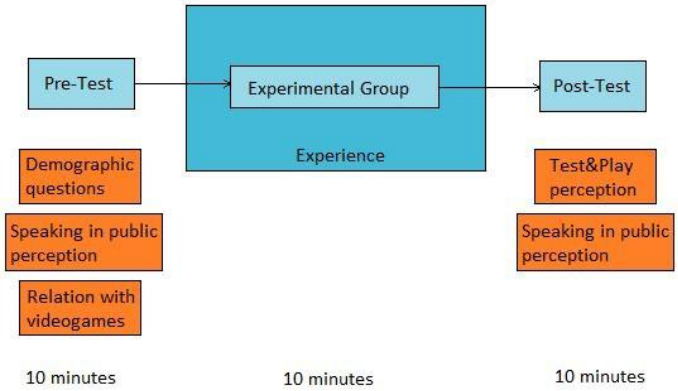

Figure 3. Experimental design scheme.

In part 1 of the experiment the participants answered two questionnaires prior to the use of the application. The first one identifies the type of game the participants are. The second one identifies if they consider themselves good or bad speakers and their self-security when speaking in public (See table 1).

Once the questionnaires were answered, part 2 started: a test with the application. The participants entered virtual reality and played Talk&Play for 10 minutes without external indications (See figure 2).

Finally, and after part 2, part 3 starts passing the final questionnaire. They answered a questionnaire to identify if after using the application they feel safer when speaking in public and if they think this application can help them improve their oratory.

Table 1. *Questionnaires summary*

Question	Type	Variable measured	How it is calculated
Self-confidence when talking in public before and after Talk&Play	7-point scale	Improvement of self-confidence	Summing up values before playing and after playing
Aspects of public speaking they consider important before and after Talk&Play	Multiple-choice question	Raise of awareness of the importance of volume and silences	Summing up the number of selected volume, speed or silences
Knowledge about the correct use of silences and volume after Talk&Play	7-point scale	Teaching properties of Talk&Play	Summing up all values

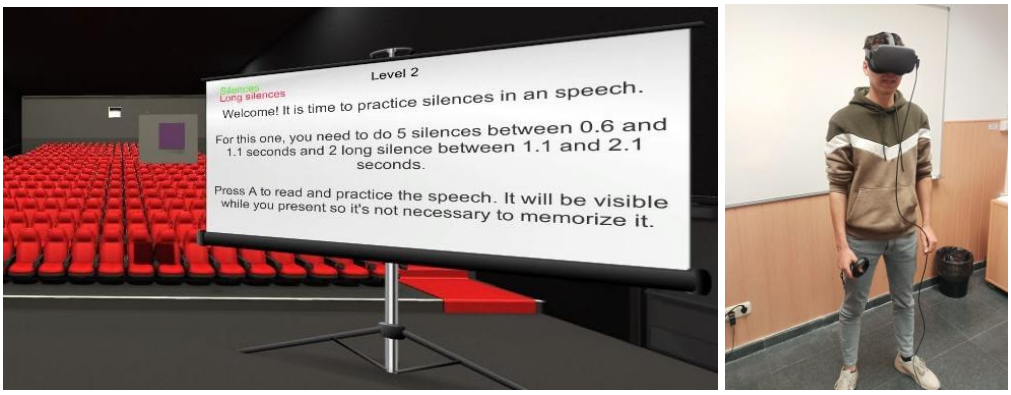

Figure 2. The silences minigame in phase 2 of level 2 and a participant in part 2 of the experiment.

3.3 Instruments and materials

For this experiment we needed hardware and software. The software part was the created application, a virtual reality videogame, developed in Unity 2020.3.33f1, which teaches about silences, speed and volume during a speech. The hardware part consisted of the Oculus Quest 1 virtual reality headset connected through Oculus link with a MSI laptop (MS-16p7) for executing the videogame.

Also, each participant had to answer three questionnaires. The first one was a validated questionnaire whose purpose is to know the type of gamer the participant is. The other two were questionnaires created specifically for this. The first one asked about demographic data of the participants, their vision of themselves related with oratory and their vision of their self-security when speaking in public, last two before playing the game. The second one asked about their perception of the teaching properties of the application and the aspects of the oratory they consider the most important, both before and after playing.

3.4 Results

At first, we did a T-student probe for related samples. In it, we compared the obtained results in user's talking in public self-confidence related questions. In this analysis we can observe (See table 2) a

statistically significant difference between the obtained results before and after playing Talk&Play (sig = 0.043*). The answers mean goes from 4.29 (out of 7) before playing to 5.07 (out of 7) after playing, having a total increase of 0.78 between both measures.

Secondly, we measured the raising awareness the videogame creates over the importance of volume, speed and silences in public speaking. For this, we summed up the number of elements the users think are important, before and after playing. Afterwards, we did a T-student probe for related samples between these two sums. The results this probe gives (See table 2) indicates a statistically significant difference (sig.=0.01*) between the elements the users think are important for public speaking. Measure goes from 1.43 (out of 3), before playing the videogame, to 2.43 (out of 3) after playing.

Table 2. *T-student test for related samples (Self-confidence and Awareness)*

	Mean	Std. Deviation	T value	Sig. (Bilateral)
Self-confidence	0.78	1.311	-2.242	0.043*
Awareness	1	0.877	-4.266	0.001*

$p<0.05$*

At last, evaluation questions were done for measuring how much capable of using pauses and volume correctly during a speech the users feel themselves. In relation to the first one, users answered a mean of 5.46 (out of 7). In relation to the second one, users answered a mean of 4.5 (out of 7).

3.5 Discussion

Using Talk&Play improves player's talking in public self-confidence and knowledge of the correct use of volume and silences. We think this is because the game gives information about the correct use of important aspects in public speaking and personalized feedback. When practicing with this information and feedback, the user can see its improvement and feel more secure doing a speech.

As well, it raises awareness of the importance of the treated aspects in a speech. We think it is because the game gives information about why these aspects are important and not only how to improve them. This lets the user figure out the difference between using them correctly or not in a speech.

Finally, we could see the demographic and videogames relation data collected does not modify the results. We think this is because this data in this experiment does not affect the learning process. Maybe, in a bigger experiment with a more varied population the results could change.

4. Conclusions and future work

Public speaking has a lot of presence in our daily lives, not only in not very common situations, but also in day-to-day activities. Most people have difficulties speaking in public because of their fears. Practicing and learning how to do it is the best way to overcome this situation. For speaking in public correctly many aspects must be taken into consideration, for example, voice volume, use of silences and speed. For improving these three aspects, we have created Talk&Play, a virtual reality videogame in which users can learn and practice the use of the volume silences and speed and their importance in a speech. In order to validate it, we have done an experiment evaluating the application in which the participants answered some questionnaires before and after playing with Talk&Play. Analyzing the received answers, we have drawn three conclusions:

1) Talk&Play increases user's speaking in public self-confidence. We have realized a large majority of the participants have increased their self-confidence during the experiment.
2) Talk&Play raises awareness of the importance of volume, speed, and silences in public speaking. The percentage of participants who thought volume, speed and silences are important in a speech before playing, increased significantly after playing.
3) Users learn with Talk&Play how to use volume and silences, but the application still needs to improve. The participants declared they have some confidence on knowing how to use silences correctly after playing, but not so much confidence on knowing how to use the volume correctly.

Nevertheless, the experiment presented in this paper only counted with fourteen people, making it a preliminary experiment and impossible to reach definitive conclusions.

There are many things to improve in the future. The main goal is to increase the learning factor. For achieving this, more visual changes for helping the user know which volume must be used should be added. Additionally, the volume real life feedback should be modified to make it easier to understand. Also, more explanation on how to decide which volume to use or where to do a silence during a speech will help on the learning process.

Furthermore, other minigames, such us fillers recognizer, could be implemented to teach the user it is all right to do a silence instead.

Finally, another experiment for evaluating the changes with a significant number of participants will allow to have definitive conclusions and find other aspects to improve.

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