Teaching Voice Management as an Extra-linguistic Competence for the Interpretation Trainee: Pitch, Pace, Pauses

تدريس كفاءة ضبط الصوت الفولغوية لطالب الترجمة الشفهية: الشدة والوتيرة والوقفات الصوتية

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Abstract:
This study aims to develop the voice in interpreting training as an extra-linguistic competence that accompanies the linguistic part of the delivery by answering to what extent does it impact the interpretation performance quality. The empirical study tested and trained a group of interpreting students and analyzed their results in an attempt to shed light on the most important keys to acquire this competence and integrate it as a didactic subject in their curriculum or post-academic training. With this in mind, the study scrutinizes three features which are the pitch, the pace, and the pauses that all together funnel into the same target to improve the rendition. At the end, Participants acquired new phonation behaviors and a certain professional command of their voice with a higher level of awareness about it.

Keywords: Interpretation, voice management, pitch, pace, pauses.

ملخص:
تهدف هذه الدراسة إلى تطوير كفاءة الصوت الفولغوية في تدريب الترجمة الشفهية المرافقة لكفاءات الشق اللغوي في التسليم الترجمي، وذلك بالإجابة على تساؤل إلى أي مدى يؤثر الصوت على جودة أداء الترجمة الشفهية. اختبرت هذه الدراسة التجريبية مجموعة من طلبة الترجمة الشفهية؛ ودربتهم؛ وحللت نتائج أدائهم بغية

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ضبط أهم تقنيات اكتساب هذه الكفاءة، وإدراجها كمقياس تعليمي في المسار الدراسي، أو كتدريب عملي بعد التخرج.

من هذا المنطلق، تناولت الدراسة ثلاث خصائص صوتية هي: الشدة والوتيرة والوقفات الصوتية التي تتضافر في نفس النسق لتحسين الأداء الترجمي. في النهاية، تمكنت العينة التجريبية من اكتساب سلوكيات جديدة في استخدام الصوت بوعي أفضل؛ وقدر معين من التحكم الاحترافي في صوتها وهو ما انعكس إيجابا على أداءهم الترجمي.

كلمات مفتاحية: ترجمة شفهية، ضبط الصوت، الشدة، الوتيرة، الوقفات الصوتية.

1. INTRODUCTION

Interpreters are professional communicators and public speakers (Mead, 2000, pp. 90-91, Cecot, 2001, Ahrens, 2005, p. 51). They are language consumers and producers, for they receive a message in a language and deliver a new one in another language and are extra-linguistic skills users, for they perform in front of an audience. One of the most essential public skills on which a significant part of their job stands is the voice. Indeed, they should develop their voice skills as carefully as they do with their working languages competences and interpretation techniques because volume, rhythm, tone, pitch, intonation, pace, timbre, pauses, flow, quality, loudness, resonance, and any other character related to the vocal delivery give further or more precise sense to the meaning of the speech, or modify a detail in it. For such reasons, it is of paramount importance to conduct this study on interpretation graduated students.

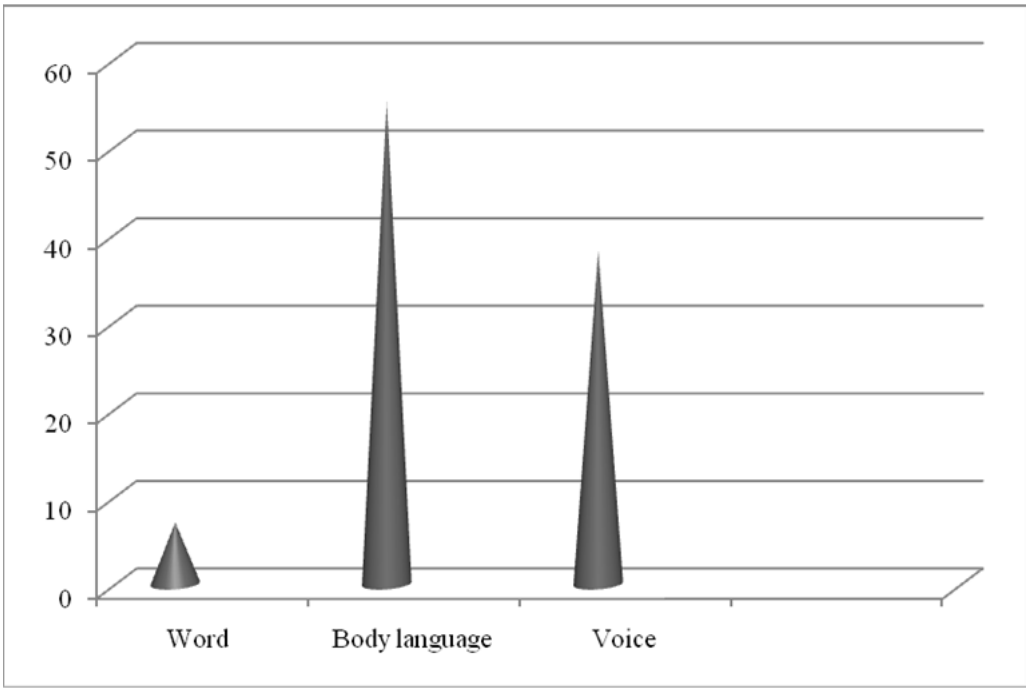
Professor Albert Mehrabian's findings about the communication model in the 1960s significantly changed the perception of the communication process in its spoken form. The external structure of an aurally production is no longer ignored in a communication; the non-verbal side would rather take the lion's share (93%) in this process as diagrammed in Figure 1.

The diagram shows that the meaning represents just 7% of what the word really denotes in the language, and this is the common and conventional conceptual

meaning to find in any dictionary to give its definition. It is the first and direct content charge that leads the speaker to choose a given word in a non-specific context. The huge part of the meaning goes to body language with 55%, and is contained in the way the speaker expresses the word. It may be figured out at different levels such as the facial expressions, hands' gestures, body posture, or any other external movement that might convey a meaning or add a specific detail to the general meaning. The last component in the model is the voice represented by 38% in the communication process. It includes different characteristics of the voice such the ups and the downs, the intonation, the tone, the stops, the rhythm, etc.

Figure 1

Albert Mehrabian's Communication Model



In other words, when speaking or decoding a speech, one does not have to rely on the direct meaning of a word, the speaker or the listener should consider the whole context with its extra-linguistic components that accompany the delivery. In the same line, Payotes (1997, 2002, 2003) perceived the reality of speech in a triple

audible-visual dimension; language, paralanguage and kinesics and put emphasis on the non-verbal aspect in his studies. The connotation of a given word acquires its full meaning when explained in its linguistic conceptual dimension and extra-linguistic formulas and non-verbal elements that are silent but convey something to the receiver as shown by the communication model of Professor Mehrabian. Extra-linguistic or paralanguage part is defined by Payotos:

> as the nonverbal long-term qualities of the voice, the many modifiers of it which results in marked formal and semantic changes, and the many dependent word-like sound construct, which we use consciously or unconsciously supporting, contradicting, accompanying or replacing the linguistic and kinesic messages…either simultaneously to or alternating with them (2002, p. 240).

With respect to the frame of translation, in general, and interpretation, in particular, both verbal and non-verbal aspects of the language are required (Poyatos, 1997) to accurately and correctly decode the full meaning of the message to interpret and deliver because "Prosody, pauses, voice quality, hesitations, all have a significant role in communication" (Cecot, 2001, p. 63) according to many studies (Bühler, 1985, Gile, 1995, Mazzetti, 1999, Mead, 2000, Ahrens, 2005, Rennert, 2008, Barbato, 2014) although most studies are carried out on the verbal aspects (Calaldos, 2016, p. 676).

For interpreters, the voice is instrumental in their profession (Darò, 1990, p. 90) since interpreting is typically orally processed as part of the extra-linguistic features that should be in conformity with the content (Gaiba, 1998, Ahrens, 2005). Albeit studies started focusing on the importance of including the voice management of the interpreter earlier in the eightieth (Barbato, 2014, p. 129) and studying the impact of the intonation of the interpreter on the audience (Callados Aís, 2016), some associations included it late in their trainings such as AIIC which officially realized, in 1998, the importance of training the interpreters to manage their voice and took advantage for their workshops from specialists who used to train actors and TV presenters (AIIC, 2000). They mainly worked on the voice production and its related "parameters such as breathing, diction, rhythm, articulation, and pronunciation" (AIIC, 2000, para. 9).

The voice, being a salient element to communicate not only for the listeners but also for the speaker who is going to be affected by the type of the sound that determines the feeling states and even significantly affects his/her thinking (Helfrich, 2011, Stel et al., 2012), has the power to build a bridge with the audience, attract its attention, and engage as many listeners as possible to the presentation. For this reason, the speaker/interpreter has to avoid monotony and all what could impede a normal rate of the voice such as running out of air and having shortness of breath when trying to speak very loudly, quickly and as longer as possible before to stop or pause. The regular pace when speaking is about 2.3 words per second (Helfrich, 2011, p. 87). If the interpreter is to render a 15-minute interpretation delivery, according to this average, he/she is expected to pronounce 2100 to 2250 words.

Hence, one must not fail to be aware of the correct healthy way of breathing since breathing is the raw material of the voice, and the voice is the strategic arsenal in any oral production. Therefore, there is a coordinative correlation between different parts; pulmonary system, laryngeal system, supralaryngeal vocal tract (Darò, 1990, p. 88) of the respiratory subsystem of phonation, laryngeal function and breathing process, and any dysfunction at any level would cause a myriad of disorders to the voice (Lewandowski, & Gillespie, 2016).

Not only is the voice important for a positive communication impact on the audience (Callados Aís, 2016), but also on the psychological state of the receiver. In this context, Knowlton and Larkin (2006) conducted a study about the role and the impact of the therapist's voice characteristics to treat speech pathology and audiology by progressive relaxation training (PRT). The study outcomes showed significant help to reduce the participant's tension, anxiety and heart rate through clinical examinations of their muscular activity. It seems that the therapist's voice characteristics is important to the listeners, however, more studies should be led in this context to clarify more details about the efficacy of the therapist's voice in facilitating the tension reduction and relaxation therapy to highly anxious young adult people such as the influence of the personal innate characteristics of the therapist's voice.

Professional interpreters "need to have a pleasant, interesting voice" (AIIC, 2008, para. 1), yet this does not necessarily mean a naturally beautiful voice since

having a nice voice would be something innate. In this case, the AIIC's statement intends to explain how to have a managed, controlled, and mastered voice. It also means that the interpreter has to be aware of the ups and downs of his speaker's voice, so he/she can respect the same rhythm, tone, pitch, intonation, pace, pauses, loudness, quality, etc. of the original speech and avoid unpleasant sounding voices and disfluencies such as restarts, false starts, hesitations, repetitions, ums and ahs (Mead, 2000, p. 90, Rennert, 2010, p. 103).

2. The Tasks under Study

The present experimental study is about voice features that are the pitch, the pace and the pauses. According to the medical dictionary (https://medical-dictionary.thefreedictionary.com/pitch), pitch in the field of the voice is "the quality of sound dependent on the frequency of vibration of the waves producing it", and the "Auditory perception of tone on a scale ranging from low to high, based on the frequency of vibration of the object emitting the tone. For the human voice, pitch relates to frequency of vibration of the vocal folds". Basically, the voice pitch is what determines the degree of the vibration of the vocal cords, so the frequency of the produced sounds categorizes the highness and the lowness of the voice.

In an original speech, low-pitched voice is preferable (Helfrich, 2011), as it would have more effect on the listeners and allow the speaker to think in a better abstract way (for further information about low pitch effects on abstract thinking; see Stel et al., 2012). Nonetheless, the pitch degree is dependent on the text, the context, and the content of the speech. In this case, variation is usually the key component to succeed a public speech, avoid monotony and get a persuasive prosodic structure (Kuang & Liberman, 2018) using upper pitches to emphasize important concepts, lower pitches in more emotional parts, or even regular in other positions. In addition, high-pitched voice and low-pitched voice allow a better information retention compared to medium-pitched voice as far as long-term memory is concerned (Helfrich, 2011).

Pitch range is important to inform the interpreter about the form and the content of a sentence. Hence, he/she should know whether they have to rouse the tone or to

decrease it to meet the speaker's intention and send a clear message to the listener (Jones, 1998, pp.184-185). For instance, rousing the tone at the end produces a high-pitched voice which generally means that the sentence expresses an interrogation or an exclamation. On the other hand, falling the tone produces a low-pitched voice which generally means the end of a statement. If the interpreter does not respect the intonation arrows, the meaning of his/her delivery might be confusing, and obviously different from the original speaker's intention if not opposite in some cases (Jones, 1998, p. 186).

Callados (2016) carried out a pilot study to show the impact of intonation on the interpreter's rendition in simultaneous interpretation. According to the subjects inquired, she found out that monotonous intonation negatively impact the voice quality parameters such as the accent, the diction and the flow which may also affect different levels on the verbal language like cohesion, grammaticality, and terminology. Not only does it impact the form of the language but also the content as far as the interpretation is concerned such as the correctness and comprehensiveness of the interpretation. The questionnaire feedback evaluation demonstrated that monotonous intonation made the subjects feel bored and distracted, as they could not fully concentrate on the content of the delivery. Some got nervous and found it difficult to grasp the meaning of the rendition and stated that they had to deploy more effort to understand. Callados concluded that the negative impact of monotonous intonation affects both the quality of the interpretation and the interpreter's credibility and professionalism whereas non monotonous intonation gave a batter impression on the listeners.

Pace of the voice is the speed and the rate of the speaking. Neither much raised speed nor much lowered speed is desirable in a speech. The speaker would rather moderate the pace of the vocalization according to his/her speech parts requirements, i.e. it should obey to the rhythm of the reception of the audience to what is being said. Hence, in all cases, very high or very low pace should not characterize the speech rate. Otherwise, the listener would lose concentration by being confused not to grasp the whole meaning when it is delivered at a very high pace or may tend to sleep due to very low vocal waves, or may be distracted by other stimulus around. Yet, generally, a fast-paced reading-faster than the usual rate- tends to activated short-term memory, be beneficial for comprehension and reduce distractibility (Breznitz, 1990).

When speaking, the speaker needs to stop for many reasons that might be personal such as breathing; functional such as grammatical junctures; or not functional such as hesitation (Cecot, 2001, p.65, Maed, 2000, p. 92, Rennert, 2010, p. 103). The pauses, as extra-linguistic features, add a value to the meaning of the speech to attract the attention of the audience on specific important parts or to put further emphasis on key words and give the opportunity to the speaker to process the information and plan the discourse. Sometimes, pauses are more eloquent than verbal words (Poyatos, 2003, p. 82). On the other hand, the flow is also an indication for extra-linguistic data to the speech. The continuity of a set of words might mean that the idea is important, and the speaker wants to keep the full attention of the listener till the end. It means the speaker considers that halting the continuity would not convey the meaning intended. In both cases, pauses and flows should be relevant to the text and the context. It is the role of the text writer or speech producer to decide when and how to pause and when to keep the flow of the reading/speaking.

Sitting inside the booth may impede the interpreter to use the pauses in a correct way since he or she may feel isolated from the meeting or think that they should not halt the interpretation, so the listener feels that some parts are missing. Hence, interpreters in such conditions are subjected to work environment circumstances (Jones, 1998, pp. 185-186). The pauses are beneficial for the interpreters because they recover the extra-linguistic elements of the speech, and they may be an opportunity for them to cope with overloading information they are consistently receiving from their earphones. Listening, decoding in language A, understanding, encoding in language B, delivering orally, and listening to the next coming input from the original speaker is a highly complicated mental process especially to be done in a very short moment.

Neither long pauses, nor continuous flow are recommendable for the interpreters. The first case may insinuate that the interpreter is not very involved or interested in the delivery, and the real pauses may lose their meaning since too many stops are randomly and unnecessarily used. The second case may suggest that the interpreter is not able to cover a high percentage of the speech which is not very reassuring for the listener.

In her pilot study findings about the credibility of the voice of the interpreter in justice administration, Barbato (2014) showed that the accused people are negatively influenced by some features of the voice. A significant high rate of the tested subjects reported got bored and annoyed by the voice of the interpreter in particular when it comes to judge two dimensions; the monotony (80%) and the personality influence (70%). The results demonstrated that credibility and professionalism are affected by the monotonous voice which, according to the subjects' statements, make them think that the interpreter is nervous and lack self-confidence and credibility. Therefore, she concluded that a great part of the content of the message is conveyed by paralinguistic elements to the accused people in a language that they do not even know. The interpreter might also be convincing and credible just by the correct and accurate use of his/her voice.

Cecot (2001) conducted a study on the role and function of pauses as a prosodic feature of non-vocal non-verbal communication in simultaneous interpretation based on the pauses categorization (filled vs. unfilled) to explain the pauses done by professional interpreters. The results showed that the subjects are not very aware about all types of pauses studied in the experiment (rhetorical, segmentation, hesitation), they only remembered hesitation pauses as they thought it was the most challenging for them because they received a high rated speech. Cecot concluded that public speaking skills are a must for the interpreters to be aware of the use of the pauses and improve their fluency using appropriate pauses and avoiding the inappropriate ones.

3. Experimental Study

3.1. Objectives

The main objective of the current study is, on the one hand, to evaluate the importance of an extra-linguistic parameter of the oral language which is the voice when delivering a message by an interpreter. On the other hand, it aims at training the subject participants to, first, be aware (Ahrens, 2005) of the importance of this parameter in bettering the quality of the interpretation rendition, and second, to acquire the competence to manage his/her voice according to the original speech (Darò, 1990, p. 90) at the three studied levels: pitch, pace and pauses. For instance, the trainee will be able not to completely eliminate the pauses since they are not all disfluencies and some are functional but to use them in a more natural and

appropriate way when they coincide with the grammatical segments (Maed, 2000, Cecot, 2001). He/she will also learn to adjust the pace and the pitch of his/her voice.

4. Materials and methods

4.1. Subjects

Three master degree interpretation students (2 female, 1 male) graduated between 2016 and 2017 from the University of Algiers 2 (Algeria) have voluntarily participated and been tested and trained for the tasks of this experimental study at three phases: Pre-training test, training, post-training test. They all got the same training offered by the university, i.e. a two-year master degree in two languages: Arabic and English. Arabic is their A language, and English is their B language. During their academic curriculum, they worked from and into both combination directions.

4.2. Design and Procedure

In this study, the participants are instructed to interpret both tests' speeches in both directions of their working languages. The speeches are all about one topic: COVID-19 delivered in 2020 by different speakers. Because they are not tested on the accuracy of the content of their interpretations, and because professional interpreters have the full right to be informed about the topic they will interpret in prior, the participants receive the title of the tests' topic, so they could prepare the appropriate terminology before the experiment starts. However, they do not know who are the speakers they will interpret for.

The participants render their interpretations simultaneously which will be tape recorded in order to be scrupulously studied and analyzed later and to guarantee a more credible result. We used special software Adobe Audition 2020 (https://www.adobe.com) to trace their voices waves, as the study is about voice management. They all interpret the same speeches, the same length (5 to 8 minutes), the same extract, and at the same order. They receive the whole speeches, but they have to respect the instructions from where to start and where to stop the interpretation.

5. Experiment Study Phases

5.1. Phase one: Pre-training Test Phase

For this part, three speeches (Table 1) are, one by one, sent to the participants who are asked to interpret them simultaneously. The participants had not been informed about the speakers earlier, but they had been given the main topic (COVID-19) to be able to prepare their terminology. The required time-length to interpret is estimated at 5 to 8 minutes. Hence, they have to hand the rendition back 7 to 10 minutes after the reception of the speech first.

Table 1

Information about Tests' Speeches

Speaker	US President, Donald Trump (Global News, 2020)	WHO President, Tedros Adhanom Ghebreyesus (Adhanom Ghebreyesus, 2020)	Jordanian King, King Abdullah 2 (Al-ghad TV, 2020)
Date	2020 (full date not available)	27 March 2020	23 March 2020
Interpretation time /Original time	5 minutes (2:20-6:30) / 58:45 minutes	8 minutes (2:37-10:27) / 52:21 minutes	5:13 minutes / 5:13 minutes

The participants are not informed by the objective of the experiment at this stage because their rendition should be as natural and spontaneous as possible. It means that they do not have to be aware of the purpose in order not to give a polished interpretation just for the activity, as the main objective is to train them to be more aware and spontaneous in a correct way in their future renditions whenever it is required.

This part is a referential base to study the effectiveness of the training comparing the quality of the pre-training test interpretations with those of the post-training test. It consists of three levels, as the experiment studies the voice management

pitch, pace and pauses. Each level has its own speech and is explained as shown below:

5.1.1. Speech 1: Pitch Test

Voice frequency was measured and traced independently to participants' gender, age, and natural features because the aim of the present study is not to standardize the voices' pitches, but it is to train participants to control the variation of their voices. It is enough to make them realize the increasing and decreasing positions in the original speech according to the original speaker but using their own voice features. The first speech test aims to analyze whether the participants are respecting the rhythmicity of the speaker or randomly interpreting according to what they personally feel comfortable.

The original speaker's speech and participants' renditions have been interpreted into spectrograms to show the pitches tracing and their conformity degree with the original speech. These figures facilitate the visual ups and downs representations of the performance results and allow a better analysis at three stages: the start, the middle and the end of the speech and the interpretation delivery. The following table (Table 2) depicts all the figures of this first part:

Table 2

Pitch Spectrograms of the Speakers and the Participants

		Part 1 (00:00-01:00 m of the speech)	Part 2 (01:30-02:30m of the speech)	Part 3 (last minute of the 5-minute part)
Original speech	**Spectrogram**			

	Figure	Figure 2	Figure 3	Figure 4
Participant 1	**Spectrogram**			
	Figure	Figure 5	Figure 6	Figure 7
Participant 2	**Spectrogram**			
	Figure	Figure 8	Figure 9	Figure 10
Participant 3	**Spectrogram**			
	Figure	Figure 11	Figure 12	Figure 13

From Table 2, we notice that Figure 2 of the original pitch is quite high (00:00-01:00m) because it is the beginning, and the speaker is warmly opening the speech and welcoming the audience. It contains higher parts and lower parts. Participant 1's start (Figure 5) is low compared to the original; its highest pitches are even lower than the lowest ones of the original. Participants 2 and 3's starts (Figure 8 and Figure 11) are remarkably very low.

The second spectrogram of the original speaker traced a decrease of the voice pitch because the speaker had exposed some bad news about affected and dead people by COVID-19, and tried to share compassionate feelings with their relatives and the inhabitants of the region. His voice was part of the paralinguistic data about the moving situation to express his state. It seems that all Participants (Figure 6, Figure 9 and Figure 12) did not focus on this detail since they kept the

same pitch from the beginning. Compared to their first spectrograms, they did not lower the pitch to respect the original pitch that decreased. The interpretation of the spectrograms shows that the state of the speaker has not changed so far which is not correct.

The last spectrogram of the original speech (Figure 4) is lower compared to the first (Figure 2) and the second (Figure 3), as the speaker was reaching the end of the statement and closing this part of the speech. All Participants' spectrograms (Figure 7, Figure 10 and Figure 13) show the same monotony with the same pitches as their first and second spectrograms' pitches. There is no difference between the opening, the middle and the closing in their interpretations.

5.1.2. Speech 2: Pace Test

The second speech test aims to analyze whether the participants are respecting the pace of the speaker or randomly interpreting as they personally feel comfortable. The speed was analyzed according to the number of words per minute. Table 3 lists those rates as follows:

Table 3

Pace of the Speaker and the Participants

	Voice Frequency Rates (word/minute)								
	Part 1 (first minute)	**%**	**(+/-) %**	**Part 2 (06:37-07:37m)**	**%**	**(+/-) %**	**Part 3 (09:27-10:27m)**	**%**	**(+/-) %**
Original	90 w	100	100	120 w	100	100	110 w	100	100
Participant 1	67 w	74.44	-25.56	51 w	42.5	-57.5	50 w	45.45	-54.55
Participant 2	51 w	56.66	-43.34	15 w	12.5	-87.5	33 w	30	-70
Participant 3	76 w	84.44	-15.56	68 w	56.66	-43.34	58 w	52.72	-47.28

In the first part (first minute), Participant 3 was the closest to the rate of the speaker rendering more than 84% of the speech and omitting less than 16% which makes her pace the most faithful to the original one. The second position goes to Participant 1, as she lost 25.56% of the total number of the original words representing the quarter of the speech, i.e. of the pace also. Participant 2 is far from respecting the original pace, as he could just render half the whole number of the original words rating 56.66% and losing, hence, 43.34%.

Concerning the second part of the speech (06:37-07:37m), the rates of all Participants are remarkably lower than the original one, and the closest one (Participant 3) got 68 words out of 120; the equivalent of 56.66% of the speech. Participant 1 lost more than half and is, therefore, more than 57.50% slower than the speaker's pace. Participant 2, again, is very late and very slow with 87.50% less than the original speech.

Analysis of the last minute of the interpreted speech (09:27-10:27m) shows that both Participants 1 and 3 had quite the same pace with an advance of 7.27% of the Participant 1 recording 45.45% and 52.72%, respectively. Participant 2 was the slowest comparing to the previous ones, for he lost 70% from the original rate.

The data analysis of Table 3 shows that all Participants used fewer words than the original speaker in the three parts indicated by time yet with different percentages. Some interpretations (Participant 3) could be acceptable if we have to take into consideration input time to understand, interpretation process, and delivery on the one hand, and the syntactical differences between both linguistic systems of English and Arabic. Yet, Participant 3 could better her rendition considering the pace importance in her interpretation. Participant 1 needs to work more on her pace to be in conformity with the original and cope with the pace. When it comes to consider Participant 2, it is important to stress the big gap between his rendition's rate and the one of the original speaker which cannot be admissible.

5.1.3. Speech 3: Pauses Test

The third test aims to analyze whether the participants are respecting the flow and the pausing of the speaker or randomly interpreting as they personally feel comfortable. To clarify the task, stops have been categorized into four colons; natural (N) for breathing, functional (F) for grammatical reasons, both (N/F), it

means the functional stop coincides with the breathing one, and non justified pauses (N/J). Stops are charted in (Table 4) as follows:

Table 4

Pauses of the Speaker and the Participants

	Pauses (00:00-02:00 m)				
	N	**F**	**N/F**	**N/J**	**Total**
Original	6	21	20	0	47
Participant 1	2	9	7	28	46
Participant 2	2	2	7	39	50
Participant 3	3	6	11	15	35

The original speaker tends to pause a lot in his delivery, and he does it in purpose because he wants to make himself clear to the listeners, to attract their attention, and to make them think about every single word in such a difficult situation. Pauses in this case are, more than being functional, characterizing his speech delivery.

All Participants seem to use the lowest number (2-3 stops) to breathe, as they were all trying to cope with the maximum amount of the speech content in order not to miss a lot. It also seems that their breathing stops coincided somehow with the functional ones (7-9 stops). However, the alarming disequilibrium is the rate of functional and non justified stops. The first category is very low (2-9 stops), and the second is very high (15-39 stops).

Analyzing those two categories of the original speech, we find that the original speaker's stops are appropriate in the speech being whether completely functional, or natural coinciding with functional pauses with just 6 stops out of 47 typically natural; generally to breathe to give them a meaningful use in his sentences. Also, we notice that he had 0 non-justified pauses which means that all his stops are structured within the speech.

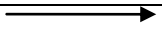
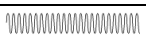
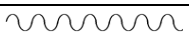
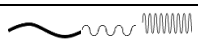
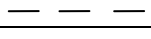
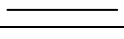
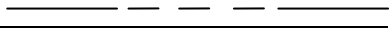
Participant 3 had a slight advance in her delivery compared to Participants 1 and 2 in terms of non-justified pauses with 15 stops in front of 28 and 39 of other Participants. On the other hand, she used more meaningful natural functional pauses recoding 11 stops compared to 7 for both Participants 1 and 2.

5.2. Phase two: Training Phase

At this phase, participants are informed about the objective of the experiment because they are recommended to focus on the target during the training activities and being aware of their voice in further interpretations. Table 5 traces all the activities of this phase:

Table 5

Training Phase Activities

Num.	Level	Test Types			
01	**Pitch**	Raising up	Regular	Falling down	Mixed
					
02	**Pace**	Fast **700-750 w/ 7 m**	Regular **700-750 w/ 5-6 m**	Slow **700-750 w/ 3-4 m**	Mixed
					
03	**Pauses**	Discontinued	Continued	Mixed	
					

5.2.1. Pitch training : A series of forced-choice pitches is proposed to adopt and respect during their readings into 4 trainings :

5.2.1.1. Training 1: Regular Pitch

Participants are asked to read a text in an average pitch; it means they have to use their regular voice height with no effort to speak upper or lower than usual. Their reading is tape recorded and the sound of their voice is traced to be used as a referential element to the next two activities.

At this stage, the instructions allow them to adopt the normal pitch they feel the most comfortable, natural and spontaneous with. However, they dictate them to respect this pitch along the whole reading for the current activity-the first.

That is to say that this activity has a double purpose: it serves as a reference to detect and determine their average pitch, and to train them to respect a certain-regular- pitch which will teach them, and mainly train them, to control their own voice whenever they need to and not being overwhelmed by the pressure of rendering the interpretation in any random pitch.

In the next three activities (2, 3 and 4), Participants work on the same text of this first activity. The purpose is to train them to manage their voice whatever is the text, and even if it is about the same text because the most important competence to acquire is to be able to control the voice without considering the corpus.

5.2.1.2. Training 2: Raising up Pitch

As far as this activity is concerned, participants are asked to read the same text-the first one- in an upper pitch; it means their voice waves should get higher than their previous regular pitch. Their reading is tape recorded and the sound of their voice is traced to be analyzed compared to the previous regular tape.

At this stage, the instructions ask them to adjust the pitch of their voice to a tenser phonation level at which they obviously would do further effort and feel less comfortable, as it is not-necessarily- their normal, natural and spontaneous pitch to which they are used in their daily life conversations. Nonetheless, these instructions dictate them to respect this pitch along the whole reading for the current activity.

The main objective of the this activity is to train them not only to be aware of a different pitch of their voice but also to teach them, and mostly to train them, to rise their voice whenever it is required in a professional way during their interpretation delivery.

5.2.1.3. Training 3: Falling down Pitch

On the matter of this activity, Participants are asked to read the same text in a decreased pitch; it means their voice waves should get lower than their regular

pitch. Their reading is tape recorded and the sound of their voice is traced to be analyzed compared to the regular tapes.

At this stage, the instructions ask them to adjust the pitch of their voice to a lower level at which they obviously would do further effort and feel less comfortable, as it is not-necessarily- their normal, natural and spontaneous pitch to which they are used in their daily life conversations. Nevertheless, these instructions dictate them to respect this pitch along the whole reading for the current activity.

The main objective of the this activity is to train them not only to be aware of a different pitch of their voice but also to teach them, and mostly to train them, to fall down their voice whenever it is recommended in a professional way during their interpretation delivery.

5.2.1.4. Training 4: Mixed Pitches

For this activity, Participants are asked to read the same text in mixed pitches; it means their voice waves should vary between the three pitches: up-regular-down repeatedly. Their reading is tape recorded and the sound of their voice is traced to be analyzed compared to the regular, higher and lower tapes.

At this stage, the instructions ask them to adjust the pitch of their voice to different levels: rising, regular and falling. Participant might not feel comfortable to get from a wave level to another, as it is not-necessarily- their normal, natural and spontaneous pitch to which they are used in their daily life conversations in a controlled way. However, these instructions dictate them to respect the succession of the three pitches (up-regular-down-regular-up-regular-down-, etc.) along the whole reading for the current activity.

The main objective of the this activity is to train them not only to be aware of a different pitch of their voice but also to teach them, and mostly to train them, to vary their voice pitches whenever it is recommended in a professional way during their interpretation delivery.

The following table (Table 6) includes the spectrograms of the Participants' pitches:

Table 6

Pitch Training Results

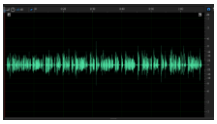
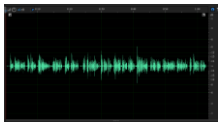
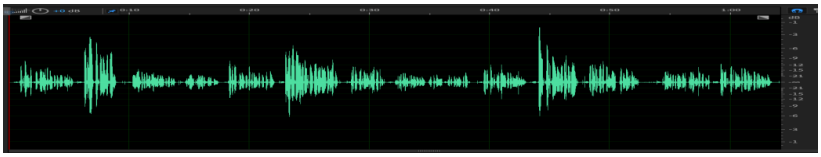
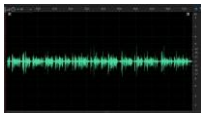
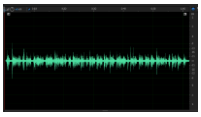
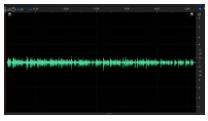
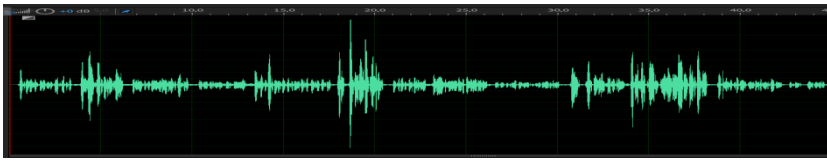
		Regular	Raising up	Falling down
Participant 1	**Spectrogram**			
	Figure	Figure 14	Figure 15	Figure 16
	Spectrogram			
	Figure	Figure 17		
Participant 2	**Spectrogram**			
	Figure	Figure 18	Figure 19	Figure 20
	Spectrogram			
	Figure	Figure 21		
Participant 3	**Spectrogram**			
	Figure	Figure 22	Figure 23	Figure 24
	Spectrogram			
	Figure	Figure 25		

Table 6 clearly shows that all Participants correctly performed the activity, as we can notice the second colon of Raising up spectrograms (Figure 15, Figure 19 and Figure 23) indicates higher waves than those of the first column's spectrograms (Figure 14, Figure 18 and Figure 22) that trace their regular pitches. In the same line, the third column's spectrograms (Figure 16, Figure 20 and Figure 24) indicates that the waves are smaller than the regular ones.

Interestingly, the fourth spectrograms (Figure 27, Figure 21, and Figure 25) of all Participants show a variation of waves that are regular-higher-regular-lower-regular-higher as they were asked to do in the training instructions of mixed pitches.

It is, nonetheless, worth mentioning that all pitches are not alike since Participants have different pitches. For instance, Participant 3's pitch is naturally higher than Participant's 2 pitch. Also, It is to notice that, generally, or at least for Participants of the experimental study, the regular pitch and the lower pitch are quite similar in terms of tone (see for example Figure 14 and Figure 16 of Participant 1, or Figure 22 and Figure 24 of Participant 3).

5.2.2. Pace Training : A series of forced-choice paces is proposed to adopt and respect during their readings into 4 trainings as follows:

5.2.2.1. Training 1: Regular Pace

Participants are asked to read a text in an average pace (140-150 words per minute). The text contains 700-750 words to be read in 5 minutes. It might be challenging for them, for they are required to manage to read the 700-750 words in a 5-minute period not more or less as a first experience for them in a conscious way. To that end, this first activity could be considered as a personalized pace adjusting training for the participants. Their reading is tape recorded to serve as a regular pace reference. The time of their reading is checked by a stopwatch set on 5 minutes and written down in a chart.

The main purpose of this activity is to train them to respect the regular pace of speaking/reading and to be able to use it if a given situation necessitates this speed according to the original speech in the case of interpretation delivery.

In the next three activities (2, 3 and 4), Participants work on the same text of this first activity. The purpose is to train them to manage their voice whatever is the text, and even if it is about the same text because the most important competence to acquire is to be able to control the voice regardless of the corpus.

5.2.2.2. Training 2: Slower Pace

Participants are asked to read the same text of 700-750 words in 6-7 minutes (+20%) = +1 to 2 minutes of the regular rate (Breznitz, 1990)). It means they have to read the same previous length in a longer period of time. Participants have to adjust their reading to the new time setting and slow down a bit their reading

compared to the first experiment. Their reading is tape recorded to be analyzed compared to the regular pace. The time of their reading is checked by a stopwatch set on 7 minutes and written down in a chart.

The main purpose of this activity is to train them to adjust their speaking respecting a given time in accordance with the original speaker when delivering an interpretation and not to speak faster.

5.2.2.3. Training 3: Faster Pace

Participants are asked to read the same text of 700-750 words in 3-4 minutes (-20% = -1 to 2 minutes of the regular rate (Breznitz, 1990)). It means they have to read the first text in a shorter period of time which might be challenging for them. Participants have to adjust their reading to the new time setting and speed up a bit their reading compared to the first experiment. Their reading is tape recorded to be analyzed compared to the regular pace. The time of their reading is checked by a stopwatch set on 3 minutes and written down in a chart.

The main purpose of this activity is to train them to adjust their speaking respecting a limited time in accordance with the original speaker when delivering an interpretation and not to speak slower.

5.2.2.4. Training 4: Mixed Paces

Participants are asked to read the same text of 700-750 words at different pace levels: regular-faster-regular-slower, etc. respecting the highlighted parts of each pace (sentence by sentence). Their reading is tape recorded to be analyzed in accordance with the three previous experiments.

Participants might not feel comfortable to get from a pace level to another, as it is not-necessarily- the normal, natural and spontaneous pace to which they are used in their daily life conversations in a controlled way. However, these instructions dictate them to respect the succession of the three pace levels (slower-regular-faster-regular-slower-regular, etc.) during the whole reading for the current activity.

The main objective of the this activity is to train them not only to be aware of a different pace levels when speaking but also to teach them, and mostly to train them, to vary their speaking pace levels whenever it is recommended in a professional way during their interpretation rendition and to avoid monotony.

The following table (Table 7) includes the spectrograms of the Participants' paces:

Table 7

Pace Training Results

	Paces / Time (m)			
	Training 1 : Regular	**Training 2 : Slower**	**Training 3: Faster**	**Training 4: Mixed**
Participant 1	05:12	07:01	03:01	06:14
Participant 2	05:10	06:56	03:58	05:45
Participant 3	05:07	06:40	03:41	03:59

It seems that Participants could respect the regular reading with a slight advance of few seconds (07-12 s). In the slower and faster readings, they respected the time very well (06-07m and 03-04 m respectively). Regarding the last activity, the mixed paces time varied from participant to another (e.g.: Participant 1; 06:14 and Participant 3; 03:59). They were not limited by the time, so they were just focusing on different rates with reference to their personal pace.

5.2.3. Pauses Training : A series of forced-choice pauses is proposed to adopt and respect during their readings into 3 trainings as follows:

5.2.3.1. Training 1: Random Pauses

Participants are asked to read a text pausing, breathing and respecting every single stop in the text in a discontinued way. The reading is controlled by highlighted pauses that participants should respect within the text silently counting (123) where indicated. The 121-word text contains 52 random pauses. Their reading is tape recorded and their pauses are counted and charted in Table 8.

This activity aims at training the participant to respect the pauses and supply the respiratory system by the required quantity of oxygen to be able to carry on reading in a natural way.

In the next two activities (2 and 3), Participants work on the same text of this first activity. The purpose is to train them to manage their voice whatever is the text, and even if it is about the same text because the most important competence to acquire is to be able to control the voice without considering the corpus.

5.2.3.2. Training 2: No Pauses

Participants are asked to read the text without taking into consideration the grammatical pauses. They just have to pause for breathing when necessary in a continued way. There is no pause mark in the 121-word text. Their reading is tape recorded and their pauses are counted and charted in Table 8.

This activity aims at training the participant to speak as longer as possible to be able to cope with the original speech in case of continued flow.

5.2.3.3. Training 3: Functional Pauses

Participants are asked to read the same text at both discontinued and continued flow respecting the pauses and non-pauses indications highlighted in the text. All pauses are functional; the 121-word text contains 29 grammatical pauses. Their reading is tape recorded and their pauses are counted and charted in Table 8.

This activity allows the participant, first, to be aware of different flows of the original speaker and, second, to acquire a competence pertaining to pausing, stopping, breathing and keeping the flow correctly when necessary.

Table 8

Pauses Training Results

	Pauses / Time					
	Training 1 (52 pauses)		**Training 2** (pauses vary)		**Training 3** (29 pauses)	
	Pauses	**Time (m)**	**Pauses**	**Time (m)**	**Pauses**	**Time (m)**
Participant 1	53	02:49	8	00:44	28	01:02
Participant 2	52	02:32	7	00:39	30	01:05
Participant 3	52	02:06	5	00:33	28	00:56

Participant 1's first reading contained one pause more than the indicated ones in the text (53/52). Her reading was very slow; she recorded the longest time (02:49) in the first reading compared to other participants (02:32, 02:06). For her second reading, she stopped 8 times to breathe because her reading was not very fast, so she needed more oxygen to carry on her reading. For the last reading, she omitted one comma, hence, one pause (28/29).

Participant's 2 respected all the pauses in the first reading (52/52). We notice that he stopped 7 times to breathe, it means one breath lesser than Participant 1 which took him lesser time to read the text also (00:39<00:44). For the last reading, he added a pause (30/29) that is not indicated in the text. The analysis of this part in the tape showed he did not stop to breathe but because he made a mistake pronouncing a word, so he had to stop and articulate again. His time for this part was the longest compared to other participants (01:05>01:02 and >00:56).

Participant 3 did well in the activity, as she respected the pauses in the first reading with 52 random and overused pauses. Obviously the second and third reading are shorter because the second contained no pauses (she stopped 5 times to breathe), and the third had functional pauses (29<52). The third reading contained 29 pauses, but she stopped 28 times, and when we checked the tape, we found that the omitted pause is a hyphen (-). We suggested that she might have considered more the periods and the commas.

6. Results

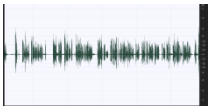
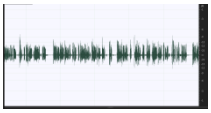
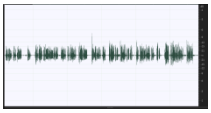
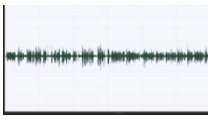
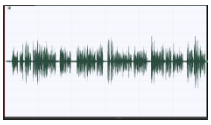
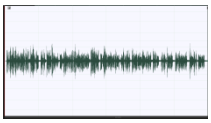
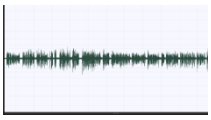
6.1. Phase three: Post-training Test Phase

Participants were asked to interpret the same speeches to test their new delivery in terms of the three competences. The results are showed in the following tables (Table 9, Table 10 and Table 11):

6.1.1. Speech 1: Pitch Test

Table 9

Spectrograms of the Participants' Post-training Test

		Spectrograms' Parts		
		Part 1 (00:00-01:00 m of the speech)	**Part 2 (01:30-02:30m of the speech)**	**Part 3 (last minute of the 5-minute part)**
Participant 1	**Spectrogram**			
	Figure	Figure 26	Figure 27	Figure 28
Participant 2	**Spectrogram**			
	Figure	Figure 29	Figure 30	Figure 31
Participant 3	**Spectrogram**			
	Figure	Figure 32	Figure 33	Figure 34

Spectrograms of all Participants show a certain change compared to their first performance and in terms of the pitch at three different levels. First, it starts high, and then it decreases a bit, and then it decreases even more at the end. Their voice's pitches clearly varied according to the original speaker's pitch. However, it seems that for Participants 1 and 2, their highest pitch is closer their regular pitch, whereas for Participant 3, her lowest pitch is closer to her regular pitch.

6.1.2. Speech 2: Pace Test

Table 10

Pace of the Participants in the Post-training Test

	Voice Frequency Rates (word/minute)					
	Part 1 (first minute)	**Improved %**	**Part 2 (06:37-07:37m)**	**Improved %**	**Part 3 (09:27 - 10:27 m)**	**Improved %**
Participant 1	72	07.46	76	49.01	63	26
Participant 2	60	17.64	35	133	52	57.75
Participant 3	87	11	83	22.05	86	32.55

Results of three Participants show an increase of the interpretations words' number compared to the pre-training test. The improvement varied, but they all increased their pace rates, and could register till more than 100% of their initial performance (Participant 3, Part 2).

Participants 1 and 3 bettered their rate and increased their pace to follow the original speaker from +7% to +49%. For Participant 2, the improvement is very high (e.g.: +133%) yet very low compared to Participants 1 and 3 in terms of words number.

6.1.3. Speech 3: Pauses Test

Table 11

Pauses of the Participants in the Post-training Test

	Pauses (00:00-02:00 m)				
	N	**F**	**N/F**	**N/J**	**Total**
Participant 1	l	27	17	3	48
Participant 2	2	7	17	22	48

Participant 3	1	29	12	1	43

Participant 1 increased her functional and natural-functional pauses compared to the pre-training test (+18 and +10, respectively). Her non-justified pauses decreased by 25. Results of Participant 2 show that his performance changed a bit compared to the pre-training test, as his functional pauses increased by 5 pauses, his natural-functional pauses by 10, whereas his non-justified pauses decreased by 17. Participant 3 pauses increased by 8 compared to the pre-training test. Her functional pauses increased by 23, natural and non-justified pauses remarkably reduced (-2 and -14 respectively). Natural-functional pauses coincided quite at the same rate; 11 in the pre-training test and 12 in the post-training test.

7. Discussion

According to the results obtained from the training, we notice that trained Participants' performance changed in a certain way.

- Participants did not get the same pitch, pace, nor the pauses of the original speakers which is logical and reasonable if we consider a set of elements:

  - Pitch: everybody has his/her own pitch that is determined according to the fundamental frequency (F0), on the one hand. On the other hand, other personal characteristics, such as gender or age may affect the results. These features can be the topic of a separate experiment, as it is outside the scope of the current study.
  - Pace: interpretation process is different from speaking process, especially if we take into account prepared speeches that are read instead of improvised. The interpretation is not prepared word by word even if the interpreter receives the topic earlier, or sometimes, some documents about the speech. Yet, this may help a lot minimize the difference between his pace and the one of the original speaker.
  - Pauses: one must not forget that hesitations and, eventually, pauses are usually part of simultaneous interpretation difficulties and challenges (Ahrens, 2005, p. 52). The process is complicated to which the times is

another taxing dimension to add. Also, grammatical structures in two different linguistic systems of two different languages are not the same. The punctuation takes different positions especially in languages so different like Arabic and English even if sometimes, pauses are not always grammatically explained; they characterize the original speaker's delivery (e.g.: Speech test number 3).

- The main objective of the experiment and the training was not to change the nature of their voice, but to make them being aware of the three voice features studied so far and train them on how to manage their own voices according to the original delivery.

- Participants' performance in the post-training test is different from the one in the pre-training test:

  - Pitch: Participants said they became more aware of their voices' pitches after the training, as they reported being focused just on the verbal content of the speech after the training. Also, the results showed that their performance changed according to the original speaker but respecting their natural pitch. They knew that they had to increase and decrease their pitches at certain parts of the speech trying to imitate the ups and downs of the speaker rather than his innate voice.
  - Pace: According to the obtained results, Participants' pace was lower than the original's one in the pre-training test, but in the post-training test, we notice a considerable improvement for all of them. They may not reach the required level to deliver a professional interpretation (e.g.: Participant 2 rendered just 35 words out 120, however, he registered an improvement of +133% in his second performance.
  - Pauses: The objective of this training is to increase the functional and natural functional pauses and decrease the natural and non-justified pauses as much as possible. It seems that all Participants met this objective although some still have to get trained more on this part (e.g.: Participant 2). Yet, it is worth mentioning that the training got a significant result, and for more improvement, Participant may need more practice.

- The improvement does not judge the Participants' quality interpretations, nor does it evaluate their delivery content. As we noticed, the improvement of Participant 2 in the pace post-training test (+133%) was much higher than his fellows, nonetheless, his rendition was the poorest in terms of number of words.

- However, and as any other study that can never be perfect or magical, sometimes the result was so slight and not as enough as it is should be to say that it is a professional delivery (Participant 2). In this case, the result is due to whether the very low performance of the participant (the case of Participant 2), or to training that is not intense enough to bridge the gap of the trainee. It might be compulsory to previously determine each trainee's performance level before enrolling them all together in the same training if the intention of the output is made on the basis of the quality rather than the quantity.

8. CONCLUSIONS AND RECOMMENDATIONS

Studies explained how important the voice in the interpretation delivery is for both the interpreter and the audience which was not the objective to demonstrate in this paper. Parting from this basis, the current study showed the possibility of training interpretation trainees to manage their voice through practical trainings.

Nonetheless, it is to bear in mind that not all Participants' performance improves at the same level, however, they all declared being more aware of their voice use, and they all tried to focus on the features studied in the experiment.

Additionally, some parameters have not been taken into account such as gender, age, or professional experience. Participants in this study all have the same diploma, but we did not precise their professional experience which may, in some cases, considerably affect the results or explain some difference in their performance or improvement.

For further horizons in future studies in the field, it might be beneficial to recommend the following hints:

- Do not neglect the importance of non verbal competences in interpretation ;
- Give more importance to public speaking competences as part of the training of the interpreter ;
- Be aware of the impact of the voice in interpretations delivery ;
- Design didactical training to integrate in the academic curriculum ;
- Suggest further complementary trainings after graduation ;
- Respect the volume, the content, and the procedure of each training according to the required competence.

Naturally, this work is not without limitations. Firstly, it was not possible to get the subjects under study in a face-to-face training, but we considered that this may be feasible as the studied competence is typically vocal. What matters the most was not the physical presence of the subjects but their tape recordings which were sent via internet.

Secondly, we assume that with more practice and more intensive trainings the results would be much better. The study aims to make them acquire a competence that may take time for some of them. Some subjects may be less receptive and or need further repetitions to be able to use the new competence correctly. This is why, in some trainings, like the one of the pace, some all Participants stated that they had to repeat some trainings to meet the limited time, especially the fastest one of 3 minutes.

Thirdly, the study took more time than expected and planned as the subjects were not always available. Sometimes, we had to wait days just for one activity of a few minutes. Initially, the number of Participants was 4, but because one of them did not finish all the activities, we had to delete his part in the study, yet he made us lose time analyzing his parts and waiting for him before to quit the experiment.

The study is not complete, and more researches could be conducted in the same line to dig deeper in the topic. For instance, future studies may analyze the impact of different variables such as gender, age, professional experience, personal features, directionality, first and second language, etc. It means there is a lot to do in the field and no single research is enough, complete or comprehensive.

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