Towards Evidence-Based Practices in Voice Pedagogy

Evidence-Based Voice Pedagogy

Author:
Filipa M.B. Lã

Affiliation:
Centre for Social Sciences, Institute of Interdisciplinaray Research
University of Coimbra

Address:
Colégio de S. Jerónimo
Largo D. Dinis
Apartado 3087´3000-995 Coimbra, Portugal
Tlm. +351 917646702
Email: filipala@ces.uc.pt

Declaration of interests:
I hereby declare that I do not have any conflicts or interests.

Abstract

Voice pedagogy was initially based on an orally transmitted master-apprentice teaching-learning model, applying observational type of learning centred in the final artistic product. Since then, this model has been continuously replaced. Nowadays, the social organization of work in globalized economies has called for the need of rethinking education so that future generations can meet the demands of lifelong learners, who are skilful at using systems of information, who are flexible and adapt to the lack of stability at work, and who are able to make their own career opportunities. How can this be applied to voice pedagogy? This work aims at finding answers to these questions, further contributing to the discussion raised at the voice pedagogy round table of the 10th Pan-European Voice Conference, "Vocal Pedagogy – What do we need?". The rationale for reflective practices in voice education and for enhancing metacognitive skills in student's using evidence-based guided awareness is discussed. The provision of meaningful feedback and the use of a holistic approach to voice teaching are presented as means to meet individual needs of different types of learners. Problem-solving and student-centered teaching-learning models are proposed as key elements in developing reflective voice practitioners.

Key words: Evidence-based knowledge; Problem-solving; Reflective voice practitioners; Student-centered teaching; Voice pedagogy

Resumen

Tradicionalmente la pedagogía de la voz se ha basado en un modelo de enseñanza-aprendizaje a partir de dominar la práctica transmitida oralmente, en la que se aplicaba un tipo de aprendizaje observacional centrado en el producto artístico final. Actualmente, la

organización social del trabajo en las economías globalizadas ha visto la necesidad de replantear la educación de forma que las generaciones futuras pueden responder a las necesidades de alumnos que aprenden de por vida, que resaltan en el uso de habilidades de sistemas de información, que son flexibles y se adaptan a la falta de estabilidad en el trabajo, y que son capaces de manejar sus propias oportunidades de emprendimiento. ¿Cómo se puede aplicar todo esto a la pedagogía vocal? Este trabajo tiene como objetivo la búsqueda de respuestas a estas cuestiones, además de contribuir a la discusión que se generó en la 10.ª Pan European Voice Conference, "Pedagogia Vocal. ¿Qué necesitamos?" Se expone la lógica de usar prácticas reflexivas en la educación vocal y que realcen las habilidades metacognitivas del estudiante, al usar el conocimiento basado en la evidencia. La provisión de feedback significativo y el uso de un enfoque holístico en la enseñanza de la voz se presentan como los medios necesarios para responder a las necesidades individuales de los distintos aprendices. Los modelos de enseñanza basados en la resolución de problemas y en el aprendizaje centrado en el alumno se proponen como los elementos clave a la hora de desarrollar profesionales de la voz conscientes, que son los que mejor cumplen con las demandas de conocimiento de las sociedades del siglo XXI.

Palabras clave: Aprendizaje basado en la evidencia; Feedback significativo; Modelos de enseñanza centrados en el estudiante; Profesionales de la voz reflexivos; Pedagogía vocal; Resolución de problemas

Introduction

The current social organization of work in globalized economies, with rapid advances in information technology, calls for a revision in career development models and in teaching-learning methods (Savickas et al., 2009). Education is expected to fulfil the requirements of the next generation of workers, developing critical reflective abilities. These are essential in a global and highly competitive working environment, with frequent and increasingly more difficult job transitions (Ilyenkov, 2007). Reflective practitioners are lifelong learners with abilities to handle sophisticated technologies, are flexible in making their own career opportunities and know strategies to cope with instability for maintenance of employability (Savickas et al., 2009). Several studies have suggested that a *student-centred learning* approach is more beneficial to the student who aims at meeting these requirements, than the *learner-centred teaching* one (Wright, 2011). In the first case, teaching activities are adjusted aiming at the enhancement of student's learning (ibid). In addition, this type of approach aims at finding possible solutions to questions such as how can education fulfil best 21st century knowledge societies' demands (Savickas et al., 2009), and how it can contribute to the development of creators (rather than imitators)?

These needs apply to all fields of education; voice pedagogy is not an exception. For example, despite the considerably amount of singers who invest years in education, only few achieve a professional sustainable self-made career (Gembris & Langner, 2005). This question was also brought into discussion by the panel of singing teachers at the 10th Pan-European Voice Conference (PEVOC) in Prague (Gill & Herbst, 2016). Discussions around "Vocal Pedagogy – What do we need?" originated three possible intertwined areas of responsibility in current voice education: voice building, coaching and rehabilitation. Voice builders are teachers that understand the physiological, acoustical and psychological aspects of voice function in order to transform the primary function of the vocal apparatus (i.e. airway protection) to a function of a musical instrument. Vocal coaches were defined as those who guide the students into the process of using their musical instrument to convey artistic meaning. Singing voice specialists were classified as those who assist students who have suffered a voice injury and who guide them back to the process of music making. Voice builders were presented as having greater overlap with the other two types of teachers (ibid.); the need for having teachers specialized in these three different areas of knowledge was significantly emphasized (ibid.).

The present work aims at further contributing to this discussion, finding other possible suggestions and encompassing teaching approaches that fit best the nurturing of the required 21st century demands in voice education.

The evolution of teaching models in singing education

The teaching of singing emerged to assist solo singers in the performance of the new monody and opera. Orally transmitted knowledge was the main available form of teaching and learning, heavily based on imitation, imagery and auditory perception (Callaghan, 2000). Thus, at those times, singing students who would like to become professional solo singers would look for a teacher who was an excellent performer (Callaghan, 1998). Generally speaking, nowadays music students look for teachers who have not only musical competences, but who would have also other attributes, such as: planning, organizational, pedagogical and communicating skills; the capacity of mediating excellent learning environments; promoting activities within and outside the educational institution; and

encouraging critical thinking and evaluation (Lennon & Reed, 2012). In particular, singing students also look for attributes that include: well-informed guidance to modify neuromuscular behaviours; observational and interpretational skills to understand particular elements involved in singing (functional, musical and expressive); the use of a variety of up-to-date pedagogical tools; and aptitude to share and discuss information (Callaghan, 1998). These qualities are not a surprise, particularly because the pedagogical discourse has shifted from the teacher to the student and from the final artistic product to the process that creates that desired artistic outcome (Lennon & Reed, 2012). The current emphasised discourse is to promote the student's independence, self-correction, self-evaluation and appraisal skills through educational methods that involve peer learning, peer assessment and more effective practicing methods (ibid.). The latter requires guided awareness through evidence-based teaching approaches.

Guided awareness through evidence-based teaching approaches: the rationale

Guided awareness though evidence-based teaching approaches is particularly important in nowadays voice pedagogy, especially if the student is at the first stages of skill acquisition (Lehman, Sloboda, & Woody, 2007). At the first, cognitive stage, the student develops a consciousness control of motor and cognitive abilities related to singing voice production. Guided awareness from the teacher is needed, as the student is still not able to replicate the same behaviour consistently in the absence of the teacher's feedback. At the associative stage, the student's vocal behaviour starts to be replicable for identical vocal scenarios. Transferring the acquired knowledge to different scenarios (e.g. different repertoire, musical styles) and becoming independent and self-regulated will be the final stage of skill acquisition, the autonomous stage (ibid.). In order to encourage a smooth transition between these stages, the teacher is responsible for, on the one hand, be an "expert listener" (Gill & Herbst, 2016) and, on the other, being a provider of objective and meaningful feedback (Welch, 2005).

Unlike any other instrumentalist, a singer needs to sculpt a set of biological systems that primarily serve the purposes of breathing and protecting the airways and only secondarily serve the purpose of music making. A violin is built with certain materials and geometrical configurations for the purposes of producing a particular acoustical expected output; it is up to the instrumentalist to take the most out of it. On the other hand, a singer has an instrument which "materials" and "geometrical configurations" are constantly changing to produce a variety of acoustical outputs (Lindblom & Sundberg, 2007). A teacher with the skills of a "voice builder" is also an "expert listener" (Gill & Herbst, 2016); he/she needs to understand the physiological, acoustical and psychological aspects of a particular vocal sound before being capable of providing feedback to modify neuromuscular behaviors and assist the building of the voice instrument. One might argue that "voice builders" would encountered great difficulties in shaping a musical instrument that is inside another persons' body and mind if knowledge is limited to or based only on personal experiences, i.e. experience-based knowledge. In such case, the feedback provided to the student is not grounded on evidence, and exercises created to build up the voice instrument might not meet the goals for which they were designed. Such ploy may mislead the student's understanding of a given feedback, which response cannot be retrieved during individual singer's practicing sessions. Thus, consistent and replicable voice behaviours would take longer to acquire. A great number of

repetitions will be required from the student before being able to achieve "Knowledge Results" (KR), i.e. the ability to understand what action to take to achieve a certain result even when the feedback is not present anymore (Welch, Howard, Himonides, & Bereton, 2005). In such scenario, more time will be spent at the cognitive stage of skill acquisition, delaying the student's transition into the following stages. This delay is not compatible with the demands imposed on freshly graduated/post-graduated singers. These are just entering a professional world that is already full with singers who are at last stage of skill acquisition, presenting autonomy in achieving outstanding levels of proficiency (Creech et al., 2008; Hallam, 2001).

In the present artistic educational system, undergraduate courses last between 3 to 4 years, and post-graduate courses between 1 and 2. Generally speaking, a freshly graduate or post-graduate singer has a total of 4 to 6 years of singing education. However, previous studies have suggested a minimum of 10 to 16 years of training before achieving professionalism (Bloom, 1985; Manturzewska, 1990). Thus, it seems important to provide efficient ways of preparing young musicians throughout education, to minimize the impacts of such short period of training in the expected levels of proficiency. In this sense, less time of education necessary needs to mean better quality.

How can students achieve the last stage of skill acquisition within the current available time frame provided in music education? One possible answer to this question is to develop a teaching-learning method that aims at developing greater levels of metacognition (Pintrich, 2002). Metacognitive control includes monitoring, control, and regulation of one's cognition and learning processes (Pintrich, 2002), highly important when a musician is developing an "artistic fingerprint" (Leon-Gerrero, 2008). How can an educator, more specifically, a voice teacher, be a promoter of high levels of metacognition? The following section aims at exploring the contribution of meaningful feedback in voice lessons.

Meaningful feedback as a promoter of metacognition in voice education

Metacognition involves knowledge of the condition and of the processes to monitor, control and regulate that condition (Pintrich, 2002). Applying this model definition into voice education, the first includes knowledge of strategy and its application under different conditions, e.g. repertoire and singing styles. It also includes knowledge of efficacy of such strategies, e.g. the benefits of adopting semi-occluded vocal tract gestures (Lã et al., 2016) and vowel modification for managing the *secondo passaggio* in classically trained voices (Sundberg, Lã & Gill, 2011), and knowledge of individual characteristics and needs, such as vocal *Fach* and physiological individual vocal limitations. The second involves the processes involved in processing tasks, such as checking, planning and generating. One can argue that a teacher who is a provider of meaningful feedback will be in a better position to assist the student in achieving both metacognitive knowledge and metacognitive control, as meaningful feedback is not exclusively grounded on experience-based knowledge. Meaningful feedback involves knowing consequences of a response, thus contributing to a smooth transition between student and professional stages of live (Creech et al., 2008).

> *The process through which an individual perceives the consequences of a response or response pattern is known as feedback.* (in M.R. Loree, 1970: pp. 409)

In education, feedback has been presented as having 5 different categories, hierarchically built on information provided by the previous one: *correction*, *reinforcement*, *forensic diagnosis*, *benchmarking* and *longitudinal development*. *Correction* is a core category, and in voice education it embraces corrective actions towards more functional, efficient and healthier voice behaviours. As less ambiguous the corrective action is, as more direct and objective the provided feedback will be. This is crucial for achieving the already mentioned KR, also related to student's self-regulation skills. For example, visual comparisons of a certain vocal output before and after the practice of an exercise specifically designed to modify that vocal output is more prone to produce KR (Welch et al., 2005). *Reinforcement* corresponds to a strong external stimulus positively or negatively reinforcing a certain behaviour (Price et al., 2010). *Forensic diagnosis* includes the development of ability to identify errors or misunderstandings in the action taken, so that it develops towards the expectations of what is a standard vocal performance, i.e. the desired artistic outcome, created within healthy physiological boundaries of the student's vocal instrument. This later category is thus intimately connected with *benchmarking* and with *longitudinal development* (Price et al., 2010). The first is essential for filling the gap between what has been understood and the quality of the expected performance. *Benchmarking* is essential for developing knowledge of content (rather than knowledge of needs for development), thus being crucial in preparing students to smoothly transit to the labour market. Finally, *longitudinal development* is focussed on what is still in need rather than what it has been accomplished, therefore promoting new ways of learning and guidance to support slowly mastery (ibid.).

Feedback and learning do not possess a linear relationship. More feedback does not always correspond to more KR (Kulhavy, White, Topp, Chan, & Adams, 1985). However, meaningful feedback might be more linearly related to KR, and thus to learning (Welch et al., 2005). Meaningful feedback aims at developing critical thinking, to support improvements in future actions, and to nurture problem-solving skills for achieving challenges that naturally come along with a vocal career (Lã, 2014). Thus, it poses questions and includes at least two aspects: one is its own quality and the other is the quality of the interactions between the student and the provided feedback. Meaningful feedback is logical and is task-orientated. A teacher-student and peer-to-peer dialogue that takes into account characteristics of all individuals involved and consequently an active process for all parts involved (Nicol, 2010).

Towards the provision of meaningful feedback in voice education

To reach meaningful feedback, at least four features should be considered: to be *adaptive* – in accordance to the idiosyncratic needs of the student - *discursive* - with plenty of exchanged dialogues - *interactive* – task goal orientated - and *reflective* – promote reflection on the goal-action-feedback learning cycle (Laurillard, 2002). With such characteristics, the feedback input coming from external sources through senses (*exteroceptive feedback*) can activate a student's inner dialogue on concepts and ideas, (*proprioceptive feedback)*, leading to an efficient action (Welch, 2005). This will be the result of: interpreting the information provided, internalising it, comparing it with own past and present experiences, evaluating the quality of the achieved action and understanding what to do to improve it in the future. Without these metacognitive skills, it will be difficult for the student to consciously influence future actions and become autonomous (Nicol, 2010).

Providing meaningful feedback in voice education might be a hard accomplishment. Voice training deals with conveying emotions and ideas with multiple possible interpretations. In addition, the voice is an extremely complex musical instrument. On the one hand, there are constant interactions between its constituting parts – breathing, phonation and resonance - so it will be difficult to transform the function of one of the parts without modifying the function of others (Herbst, 2016). On the other hand, due to the *gestalt* nature of voice production (Dosher, 1994), the provision of feedback on separate components might be incomplete for the purpose of clarity in the interactions and dialogues within a shared context of understanding. In this sense, many singing teachers defend a holistic approach to teach voice (Chapman, 2006).

Improving a voice as a mean of artistic communication is a continuous commitment that singers and teachers both have (Lã, 2014). At a basic level, this implies a balance between three interdependent elements that constitute this instrument: the breathing element, i.e. the *power source*; transglottal airflow, i.e. the *voice source*; and the vocal tract, i.e. the *sound modifiers*, supraglottic structures responsible for modifying the voice source, pharynx and oral and nasal cavities (Herbst, 2016). As these three elements are intimately intertwined, meaningful feedback is the one that addresses this interdependence as the core of the pedagogical model (Chapman, 2006). Then, other elements can also contribute to the way these core elements interact: posture - influences breathing and larynx position in the neck (Iwarsson, 2001; (Iwarsson, 1998); articulation - the means through which resonance properties of the voice can be modified (Sundberg, 1987); repertoire – determines the approaches for choosing the correct *support* of the vocal instrument; emotional coding and decoding – influences the way in which musical meaning is affectively delivered through voice use (Lã & Gill, 2015). Finally, the style aesthetics governs the articulation between all elements influencing the performance, i.e. the articulation between the core and its peripheral elements in the holistic teaching approach (Chapman, 2006).

It is the teacher's responsibility to contextualize the feedback provided at early stages of its discussion. This could be done applying both tacit and explicit knowledge, best adapting the teacher's own contexts to the student's needs. Reinforcement of this contextualized feedback through the on-going interactive exchange is also a requisite to offer fewer possibilities of misunderstandings between the message conveyed by the teacher and the one interpreted by the student. Another possibility is to encourage the student to express what type of information and interaction will be more helpful.

In this case, the student's knowledge is a key factor for judging the effectiveness of the feedback and to recognise the benefits that it provides. In such scenario, the teacher will be also responsible for providing perceptual experiences to the student in a variety of possible ways: intellectually, visually, aurally and kinaesthetically (McCoy, 2004). Applying these types of perceptual experiences is required because, on the one hand, learners possess different preferences and styles of learning (Seaman & Fellenz, 1990). On the other hand, female and male learners have different ways of responding to specific effects: men tend to be more world-focussed, i.e. respond better to visual stimuli, whereas females are more self-focused, better reacting to bodily sensations (Moriguichi et al., 2014). These sexual differences should be taken into account when the teacher is developing meaningful teaching-learning exchange, especially when regarding the impacts of sexual differences on voice functioning. For example, there are cyclical voice changes during the menstrual cycle that impact on the pattern of vibration of the vocal folds (Lã et al., 2007). In addition, female singers possess different self-

perceptions during the menstrual cycle that should not be disregarded when training their voices (Lã & Davidson, 2005). The use of hormonal related medication, such as the oral contraceptive pill, also seems to affect the singer's perception of intonation (Lã, Sundberg, Howard, Sa-Couto, & Freitas, 2012).

It is also the teacher's responsibility to prioritise, for that particular context of the learning process in which the student is surrounded, whether the feedback should be *content focussed* – knowledge provider – or *facilitating focussed* – metacognitive promoter and learning-process-centred (Price et al., 2010). In both cases, the teacher should bear in mind that meaningful feedback must nurture critical thinking for opening up new possibilities of learning and addressing future activity (Price et al., 2010).

Finally, peer learning also plays an important role in creating meaningful feedback. For example, this type of feedback has been revealed efficient when assessing student's music performance (Blom & Poole, 2004), as it encourages the "capacity to learn, the capacity to know how to learn, the capacity to know that he has learned" (in J. Heron, 1988: pp. 78).

Problem-solving as a promoter of informed practicing

The student can learn how the complex interactions between core and peripheral elements of the holist approach of voice teaching interact, and how they influence the final vocal artistic desired outcome. This is possible by, on the one hand, providing meaningful feedback during voice lessons, and on the other, by encouraging the student's transference of knowledge created by responses to that meaningful feedback onto individual practicing sessions. Thus, the teacher's role goes well beyond the teaching session; it is also the teacher's responsibility to guide the student towards an informed effective practicing scheme.

This could be achieved by applying a problem-solving methodology in voice lessons. In such teaching-learning contexts, a problem is understood as a complex stimulus that includes both exteroceptive and interoceptive events (i.e. processing of the external stimulus and of the inner caused responses) (D'Zurilla & Goldfried, 1971). Then, alternative responses and decision-making are required. The latter is crucial to efficient learning (Gagné, 1966), as most problems in musical interpretation have a range of possible solutions; the skilful music learner is the one that learns to identify the most appropriate choice behaviour. To maintain an adequate level of effective functioning, it is the teacher's responsibility to guide the student in dealing effectively with basic to complex problems when interpreting a certain piece. By creating such habit, the student will be then acquainted with the set of skills needed to be autonomous in decision making based on identifying the problem, determine the possible solutions to that problem, and choose in accordance to goals previously set. During the individual practicing session, the student will be better equipped for making informed decisions, orientated towards the goal of enhancing learning by collecting, organizing and transforming information into useful knowledge (Heimlich & Norland, 2002). Thus, one might argue that problem-solving in singing lessons will be an efficient manner of promoting self-regulation, self-evaluation and high levels of metacognition in singers. With the acquisition of such abilities, the teacher becomes a facilitator of the student's transition into the professional life (Hallam, 2001).

Evidence-based practices as a mean for efficient teaching-learning exchange

There are five elements in any educational event that comprise a model of teaching-learning exchange: the teacher, the learner (either individual or a group), the content and the environment (Heimlich & Norland, 2002). The following section is dedicated to explore the importance of quality of content in modifying vocal behavioural during teaching-learning exchange.

Voice education mostly relies on behaviour modifications (Stemple, 2005); changes in performance are achieved when there is the modification of one's behaviour (Drudge & Philips, 1976). For modifying behaviour, three types of learning can be used: *classical conditioning*, *observational learning* and *operant conditioning* (Kazdin, 2012). The *classical conditioning* has its roots in behavioural psychology. Thus, also known as *Pavlovian* or *respondent conditioning*, refers to a type of learning where associations are created between an environmental stimulus and a naturally occurring one. The *observational learning*, founded on Bandura's work and social learning theory, is focussed on watching, retaining, and replicating a behaviour observed from a model. The *operant conditioning* is a type of learning in which the behaviour is determined by the consequences (ibid.).

One might argue that in voice training, observational learning has been extensively applied. It may be sufficient at early stages of skill acquisition; however, if one wants to become a master of musical crafting through voice, i.e. to use distinguishable skills to serve the purpose of conveying individual's artistic imprint, imitation through observation might be a limited way of learning. It is therefore arguable that acquiring abilities by understanding the vocal/ musical consequences of certain behaviours, together with learning through observing and imitating, are both desired in order to learn how to become a creator (rather than an imitator).

In voice lessons, when concerned with building a functional musical instrument, modification of behaviour might start with what can be changed best and work from that onwards (Stemple, 2005). At this initial phase, tasks can be easy and small, to be achievable, facilitating motivation and reinforcement of mastery skills. Then, a gradually increase of the duration and complexity of the tasks can be done, so that each task is closer to the final pre-set goal. Self-evaluation, self-feedback, questioning, presentation of the information by means of a variety of feedback tools and carrying tasks that give the learner the opportunity to experiment, all facilitate efficiency in the continuous process that is learning through practice; as greater number of correct self-evaluations, as more correct responses are achieved by the learner (Drudge & Philips, 1976).

This line of thought corroborates the previously emphasised importance of offering musical learners opportunities to practice different tasks and perceive their consequences. Perceptual experiments increase individual's self-awareness and thus, change that is attended to. This focus on student's encoding of reality is of paramount importance for perceptual learning (Neisser, 1982), much applied when learning to play a musical instrument (Sloboda, 1982). Perceptual processing allows the acquisition of voice technique, i.e. intentional control of what is not consciously perceived. By posing questions, the teacher assists the student in discovering the ways in which automatically encoding happened.

> *Perceiving is so much like doing that the concept of skill extends very naturally to purely perceptual activities. Tracking animals and listening to symphonic music are similar in structure to skills of action. They rely on the specific properties of a medium, and they are purposively coordinated over time.* (in U. Neisser, 1982: pp. 4)

An accurate perception is therefore of paramount importance to a skilled performer. The way an individual encodes reality (i.e. the perception of self and environment) is crucial to correct behaviour that enables balance. In fact, when changing one's behaviour, the focus of one's attention in the moment of encoding the reality is of extreme value (Greenberg & Safran, 1981). For a singing student, this may also be the case. Encoding is a key element in acquiring the skills that will enable mastering of the voice as a musical instrument, since perceptual activity is greatly relevant for information processing. In other words, more than focussing on the error, the teacher should focus the student's attention on understanding his/hers perceptual activity, responsible for that error.

Reflective voice practitioner and student-centred teaching: two requisites for generating evidence-based knowledge and effective behaviour modification

Modification of behaviour through student's self-awareness is the ultimate goal of a critically reflective teacher (Larrivee, 2000). To be more specific, a reflective voice teacher has self-efficacy attributes, developing the necessary needs to create new solutions tailored to specific student's context. Teachers who do not practice critical reflection may run into the ploy of providing misleading judgments, interpretations, assumptions and expectations (Larrivee, 2000).

Critical inquiry and self-reflection are both attributes to become a critically reflective teacher. Both personal and professional belief systems, as well as ethical implications and impact of practices, must integrate the process of self-examination (Larrivee, 2000). It seems irrefutable that evidence-based should be the ground stone for such integration to occur.

Generally speaking, *evidence-based knowledge* requires continual evaluation of beliefs, assumptions and hypothesis against existing knowledge and against other plausible interpretation of that knowledge. On the other hand, *experience-based knowledge* has a great potential for distortion, as everything is contextually bound. A reflective teacher should thus consider creating time for solitary reflection, developing skills of perceptual problem-solver and be acquainted with the literature, questioning the current evidence-based available knowledge (Larrivee, 1999).

The need for these reflective practices becomes quite evident when considering the interdependency required between the three constitutive subsystems of voice production, i.e. breathing, phonation and resonance (Stemple, 2005). Changing breathing patterns will alter not only the way breathing occurs, but also the way both phonation and resonance is produced (Herbst, 2016). Thus, in order to understand the impacts of changing the way certain subsystems function on the functioning of others one certainly requires reflective practices. These are quite important when concerning the *status quo* of voice pedagogy.

Let us take the example of "support", or *appoggio*. Some pedagogues point out that "support" is solely related to the action of pulmonary system, (Lamperti, 1916). Others consider that "support" is a combination of both breathing and phonation (Dosher, 1994) or of both breathing and resonance (Miller, 1986). Such believes may lead to the creation of diverging instructions to the students and all kinds of problems related to it. On the other hand, reflective teachers would like to understand the rationale for such different interpretations aiming at a more informative decision when teaching "vocal support". As pointed out by Herbst (2016), it may be the case that, for a student that presents a breathy phonation,

changing glottal adduction may be the key for improving continuous airflow through the glottis, leading to flow phonation (i.e. maximum air flow with complete glottal closure) (Sundberg, 1987) and to better "support" of the voice. In fact, even minor changes in vocal adduction (either by membranous medialization of cartilaginous adduction) have a great impact on glottal airflow (Herbst, 2016) and on subglottal pressure (i.e. the pressure of the lungs when exceeding atmospheric pressure) (Sundberg, 1987). However, for another student, to improve "vocal support" it may mean to lower the larynx by laryngeal tracheal pull (Iwarsson, Thomasson, & Sundberg, 1998), exerting a direct mechanical effect on the supraglottal vocal tract and in the way that resonances of the vocal tract interact with the vibration of the vocal folds and glottal configuration during phonation (Herbst, 2016).

It is then evident that different singing students have the need for different explanations (Hewitt, 2006) and the use of different feedback tools that assist them in encoding their aural, perceptual and kinaesthetic perceptual information (Lã, Wistbacka, Amarante Andrade, & Granqvist, 2016; McCoy, 2004). In this sense, a holistic approach to teach voice is a more realistic one as compared to the "primal sound" concept in voice technique. In such approach, teachers focus on correcting behaviours concerned with a particular voice subsystem; however, impacts of those changes in other subsystems should not be disregarded as they might have a negative effect (Herbst, 2016). The holistic approach, on the other hand, considers alternative possibilities of changing that behaviour by working on other subsystems that lead to better function of all subsystems (Dosher, 1994; Chapman, 2006). This approach has been successfully used also in voice therapy, designed for the purposes of improving dysfunctional but also normal voices (Stemple, 2005). In either cases, it is the teacher's responsibility to provide not only meaningful feedback, but also design specific exercises to facilitate direct modification of the inappropriate physiological, acoustical or aerodynamical activities (ibid.). Through the application of tailored vocal exercises, the teacher is more able to correct encoding of the student's perceptual information of reality. In this sense, one can argue that a reflective practitioner is also someone that meets the requirements of a *student-centred teaching approach*. In this type of approach the teacher is a mentor that promotes self-awareness and reflective practices. These characteristics in a teacher are of students' best interests (Wright, 2011); for the particular case of a singer, they best serve the sustainability of a high quality and long singing career, and the requirements of 21st knowledge societies of self-made employments.

Discussion and Conclusions

The aim of this work was to further contribute to the discussion started at the 10th PEVOC, "Vocal Pedagogy – What do we need?". Drawing from suggestions made in previous literature concerning career development models and teaching-learning methods that best suite the requirements of current social organization of work in globalized economies, this article purposes the following: besides revisiting the previously pointed argument that nowadays voice pedagogy needs teachers who possess skills of voice builders, vocal coaches and singing health specialists, there is also the necessity of applying evidence-based knowledge in singing lessons towards a *Homeostatic Model of Voice Pedagogy (HMVP)*. Homeostasis can be defined as the tendency of all organisms and cells to be self-regulators of their internal environment, aiming at the maintenance of equilibrium. Homeostasis is usually

reachable by applying a system of feedback controls, all contributing to stabilize health and functioning.

This concept can be also applied to singing; through a complex system of interrelated internal and external feedback mechanisms, singers acquire the skills to maintain a healthy functional vocal instrument, able to convey artistic meaning in a sustainable way though a singing career. In the *HMVP*, the role of the voice teacher is to be a critical reflective practitioner, mentoring the development of high levels of metacognition, problem-solving and appraisal skills. Through a student-centred teaching approach that uses varied forms of guided awareness, fed by skills of voice building, vocal coaching and singing voice health specialist and evidence-based knowledge. The teacher-student exchange can then be genuine, non-judgemental and promote mutual respect. Such approach is more prone to facilitate the creation of new forms of learning.

The voice is a tool of communication (artistic or not) that relies on dynamic equilibrium between its several interdependent parts – breathing, phonation and resonance. Thus, effective voice teaching much depends on an evaluation continuing, aiming at improving the learner's metacognitive, problem-solving self-regulating and self-appraisal skills. In this *HMVP*, the singing student also becomes a critical reflective practitioner in order to succeed in tighter and often changing labour markets. In considering such model of voice pedagogy, one might contribute to a further step in diminishing the current gap between numbers of singing students graduating from artistic schools and those who are able to develop a self-made sustainable long lasting singing career.

References

Blom, D., & Poole, K. (2004). Peer assessment of terciary music performance: opportunities for understanding performance assessment and performing through experience and self-reflection. *British Journal of Muisc Education, 21*(1), 111-125.

Bloom, B. S. (1985). *Developing talent in young people*. New York: Balletine.

Callaghan, J. (1998). Singing Teachers and Voice Science - an evaluation of voice teaching in Australian tertiary institutions. *Research Studies in Music Education, 10*((1)), 25-41.

Callaghan, J. (2000). *Singing and Vocie Science*. San Diego: Singular Publishing Group, Inc.

Chapman, J. L. (2006). *Singing and Teaching Singing: A Holistic Approach to Classical Voice.* San Diego: Plural Publishing.

Creech, A., Papageorgi, I., Duffy, C., Morton, F., Haddon, E., Potter, J., Bezenec, C., Whyton, T. & Welch, G. F. (2008). From music student to professional: the process of transition. *British Journal of Music Education, 25*(3), 315-331.

D'Zurilla, T. J., & Goldfried, M. R. (1971). Problem Solving and Behavior Modification. *Journal of Abnrmal Psychology, 78*(1), 107-126.

Dosher, B. (1994). *The Functional Unit of the Singing Voice*. Metuchen: Scarecrow Press.

Drudge, M. K. M., & Philips, B. J. (1976). Shaping Behaviour in Voice Therapy. *Journal of Speech Language and Hearing Research, 41*, 398-411.

Gagné, R. M. (1966). Varieties of learning and the concept of discovery. In L. S. Schulman & E. R. Keislar (Eds.), *Learning by discovery*. New York: Rand-McNally.

Gembris, H., & Langner, D. (2005). *Von der Musikhochschule auf dem Arbeitsmarkt* (Vol. 66). Augsburg: Wißner-Verlag.

Gill, B. P., & Herbst, C. T. (2016). Voice pedagogy – what do we need? *Logopedics Phoniatrics Vocology, 42*, 168-173.

Greenberg, L. S., & Safran, J. D. (1981). Encoding and Cognitivy Therapy: changing what clients attend to. *Psychotherapy: theory, research and practice, 18*(2), 163-169.

Hallam, S. (2001). The development of metacognition in musicians: Implications for education. *The British Journal of Music Education, 18*(1), 27-39.

Heimlich, J. E., & Norland, E. (2002). Teaching Style: Where Are We Now? *New Directions for Adult and Continuing Education*(93), 17-25.

Herbst, C. T. (2016). A Review of Singing Voice Subsystem Interactions - Toward an Extended Physiological Model of "Support". *Journal of Voice, In Press*.

Heron, J. (1988). Assessment revisited. In D. Boud (Ed.), *Developing Student Autonomy in Learning* (pp. 77-90). London: Kogan Page.

Hewitt, A. (2006). A Q study of music teachers' attitudes towards the significance of individual differences for teaching and learning in music. *Psychology of Music, 34*(1), 63-80.

Ilyenkov, E. V. (2007). Journal of Russian and East European Psychology. *Journal of Russian and East European Psychology, 45*(4), 50–55.

Iwarsson, J., Thomasson, M., & Sundberg, J. (1998). Effects of lung volume on the glottal voice source. *Journal of Voice, 12*, 424–433.

Kazdin, A. E. (2012). *Behavior Modification in Applied Settings* (7th ed.). Wadsworth: Thomson Learning.

Kulhavy, R. W., White, M. T., Topp, B. W., Chan, A. L., & Adams, J. (1985). Feedback complexity and corrective efficiency. *Contemporary Educational Psychology, 10*, 285–291.

Lã, F. & Davidson, J. W. (2005). Investigating the Relationship between Sexual Hormones and Female Western Classical Singing. *Journal of Research Studies in Music Education, 24*, 75-87.

Lã, F. M. B. (2014). Learning to be a professional singer. In I. Papageorgi & G. F. Welch (Eds.), *Advanced Musical Performance: Investigations in Higher Education. SEMPRE Studies in the Psychology of Music Learning* (pp. 265-287). Aldershot: Ashgate Press

Lã, F. M. B., & Gill, B. P. (2015). Physiology and its impact on the performance of singing. In G. Welch, D. Howard, & J. Nix (Eds.), *The Oxford Handbook of Singing*. Oxford: Oxford University Press

La, F. M. B., Ledger, W. L., Davidson, J. W., Howard, D. M., & Jones, G. L. (2007). The effects of a third generation combined oral contraceptive pill on the classical singing voice. *Journal of Voice, 21*(6), 754-761.

Lã, F. M. B., Sundberg, J., Howard, D. M., Sa-Couto, P., & Freitas, A. (2012). Effects of the Menstrual Cycle and Oral Contraception on Singers' Pitch Control. *Journal of Speech Language and Hearing Research, 55*(1), 247-261.

Lã, F. M. B., Wistbacka, G., Amarante Andrade, P., & Granqvist, S. (2016). Real-time visual feedback of airflow in voice training: aerodynamic properties of two flow ball devices. *Journal of Voice*. Article in Press.

Larrivee, B. (1999). *Authentic Classroom Management: Creating a Community of Learners* Boston: Allyn & Bacon.

Larrivee, B. (2000). Trasnforming Teaching Practice: becoming the critically reflective teacher. *Reflective Practice, 1*(3), 293-307.

Laurillard, D. (2002). *Rethinking university teaching: A framework for the effective use of learning technologies.* (2nd Edition ed.). London: Routledge Falmer.

Lehman, A. C., Sloboda, J. A. & Woody, R. H. (2007). *Psychology for Musicians: understanding and acquirin the skills*. Oxford: Oxford Univeristy Press.

Lennon, M. & Reed, G. (2012). Instrumental and vocal teacher education: competence, roles and curricula. *Music Education Research, 14*(3), 285-308.

Leon-Gerrero, A. (2008). Self-regulation strategies used by student musicians during music practice. *Mudic Education Research, 10*(1), 91-106.

Lindblom, B. & Sundberg, J. (2007). The Human Voice in Speech and Singing,. In T. D. Rossing (Ed.), *Springer Handbook of Acoustics* (pp. 669-712). Stanford: Springer.

Manturzewska, M. (1990). A Biographical Sutdy of the Life-Span Development of Professional Musicians. *Psychology of Music, 18*, 112-139.

McCoy, S. (2004). *Your Voice, an Inside View: multimedia voice science and pedagogy* Princeton: Inside View Press.

Miller, R. (1986). *The Structure of Singing: System ad Art in Vocal Technique*. New York: Schirmer Books.

Moriguichi, Y., Touroutoglou, A., Dickerson, B. C., & Barrett, L. F. (2014). Sex differences in the neural correlates of affective experience. *Social Cognitive and Affective Neuroscience, 9*, 591-600.

Neisser, U. (1982). *Toward a skillful physchology.* Paper presented at the NATO Conference on the Acquisition of Symbolic Skills, Keele.

Nicol, D. (2010). From monologue to dialogue: improving wrriten feedback processes in mass higher education. *Assessment & Evaluation in Higher Education, 35*(5), 501-517.

Pintrich, P. R. (2002). The Role of Metacognitive Knowlege in Learning, Teaching and Assessing. *Theory into Practice, 41*(4), 219-225.

Price, M., Handley, K., Millar, J., & O'Donovan, B. (2010). Feedback: all that effort, but what is the effect? *Assessment & Evaluation in Higher Education, 35*(3), 277-289.

Savickas, M. L., Nota, L., Rossier, J., Dauwalder, J. P., Duarte, M. E., Guichard, J., Soresi, S., Esbroeck, R. V. & Vianen, A. E. M. (2009). Life designing: A paradigm for career construction in the 21st century. *Journal of Vocational Behaviour, 75*(3), 239-250.

Seaman, D. F. & Fellenz, R. A. (1990). *Effective Strategies for Teaching Adults.* Columbus: Merrill.

Sloboda, J. A. (1982). *Is Music a Symbolic Skill?* Paper presented at the NATO Conference on the Acquisition of Symbolic Skills, Keele.

Stemple, J. C. (2005). A Holistic Approach to Voice Therapy. *Seminars in Speech and Language, 26*(2), 131-137.

Sundberg, J. (1987). The science of the singing voice. Illinois: Northern Illinois University Press.

Welch, G. F., Howard, D. M., Himonides, E. & Bereton, J. (2005). Real-time feedback in the singing studio: na innovatory action-research project using new voice technology. *Music Education Research, 7*(2), 225-249.

Wright, G. B. (2011). Student-Centered Learning in Higher Education. *International Journal of Teaching and Learning in Higher Education, 23*(3), 92-97.