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How can principles from singing pedagogy and clinical voice therapy be combined into a vocal fatigue resistance training, and how can this artefact prevent and address the vocal fatigue of occupational voice users?

Table of Contents

Component 1

1.1 Introduction ……..3

1.2 Planned Programme of Study ……..…….4

- Theoretical Influences…….. 4
- Best Practice Influences …….……. 4
  * Morning Routine ……..5
  * Afternoon Routine …….. 5
- Methodological Influences ……. 5
- Aims and Objectives ……6
- Expected Learning Outcomes ……..7
- Activities and Assessment Criteria ……..7
- Key Resources ……8
- Assessment Criteria ……..…8
- Timescales and Review Dates ……..8

1.3 Methodology ……9

- Rationale for Methodology ……..9
- Inclusion and Exclusion Criteria ……..9

Component 2

2.1 Introduction ……10

2.2 Review ……11

1. Know That ……11
2. Know How ……14
3. Know What …… .…17

2.3 Critical Reflection ……..19

Reference List ……. 22

Appendix ……..32

COMPONENT 1

1.1 Introduction

Occupational voice disorders remain a persistent threat to workplace well-being and economic productivity, and they are still overlooked in current occupational health policy (Kristiansen et al., 2014). Sustained vocal load frequently results in vocal fatigue, reduced vocal endurance, and development of voice disorders (Hunter and Titze, 2010). Current clinical practice emphasises rest as a means of recovery, but research demonstrates that vocal rest alone does not sufficiently address the physiological and functional demands placed on occupational voices (Sliwinska-Kowalska et al., 2006; Verdolini and Ramig, 2001). Instead, strategies combining vocal efficiency training, therapeutic exercises, and preventative approaches have been shown to strengthen vocal function and reduce the occurrence of fatigue (Zadeh et al., 2024; Nanjundeswaran et al., 2015).

My rationale for this project comes from personal professional experience as a music pedagogue, where I experienced a persistent period of vocal fatigue. By applying principles from singing pedagogy, which also included voice therapy exercises, I was able to long-term manage symptoms better than my colleagues. In Module 3, I had a chance to interview my colleagues regarding their vocal health. The majority experienced voice fatigue for a few years and had no tools to deal with it. My participants for the study also included external primary school music teachers and singing teachers from other organisations working with groups. Some mentioned a lack of time and energy for their own vocal health routines, and some already battled with unresolved effects of vocal fatigue, such as muscle tension dysphonia (Martinez et al., 2021). This highlights the need for accessible, practical, and effective resources that could be aimed at these professionals.

The artefact is a structured training that integrates singing-based resistance training with evidence-based therapeutic voice exercises. It will take the form of a series of videos, designed to provide occupational voice users with accessible tools to strengthen vocal resilience, prevent fatigue, and build sustainable vocal habits. While the artefact will be evaluated in my future research, its development responds directly to a pressing workplace issue: the high prevalence of vocal fatigue among educators and the associated economic burden of voice-related absenteeism (Roy et al., 2004). By combining pedagogical and therapeutic approaches, this training resource aims not only to enhance individual vocal health but also to contribute to the broader sustainability of occupational voice work.

1.2 Planned Programme of Study

Theoretical influences

This study is grounded in the intersection of singing pedagogy and clinical voice therapy, recognising the overlapping physiological principles supporting both practices. Traditional singing pedagogy is built on breath management, resonance balancing, and vocal efficiency (Emmons, 1988), which matches therapeutic strategies for preventing strain and promoting vocal health (Al-Hussain, 2024). Current literature started to view vocal fatigue through a physiological lens, comparing it to muscle fatigue in other parts of the body, such as skeletal muscles during exercise (Sandage and Smith, 2017). But the laryngeal musculature operates differently: while it demonstrates endurance qualities, it also requires fine motor precision and coordination rather than brute strength or overexercising (Alzamendi, 2022).

This framework's key consideration is that many of the necessary tools for promoting vocal resilience may already exist in the form of established therapeutic and pedagogical practices. Exercises such as semi-occluded vocal tract (SOVT) techniques (Kang et al., 2020), functional voice training (Kapsner-Smith et al., 2015), and therapeutic breathing methods (Yilmaz et al., 2025) have each demonstrated efficacy in improving vocal efficiency, reducing fatigue, and optimising respiratory support. The innovation does not lie in the invention of new tools, but in the systematic and purposeful combination of these evidence-based practices into a "strength training" paradigm.

Within this model, therapeutic exercises will be structured around precise durations and divided into two phases: a morning activation phase designed to prepare the voice for the demands of the day, and an afternoon recovery phase aimed at winding down, settling, and resetting the vocal system. This dual-phase approach reflects principles of both physical training and clinical voice therapy (Keltz and McHenry, 2022). It aims to deliver long-term protection, functionality, and results by developing a routine compatible with the vocal load of occupational voice users.

Best Practice Influences

Current best practice in clinical voice therapy focuses on preventative care over reactive treatment, emphasising the importance of warm-up, cool-down, and vocal hygiene strategies (da Silva, de Lima and Guimarães, 2024). In pedagogy, best practice nowadays also stresses gradual skill development, inserting exercises within daily routines rather than isolating them (David, 2008). Voice clinics also advocate for short, frequent exercises rather than extended drills, because of the risk of strain increase and adherence discouragement (Rodriguez, 2014). Building on this foundation, the artefact is structured into two phases that align with occupational voice use:

Morning routine

Morning routine is designed to activate and prepare the voice for the day's demands. This phase includes semi-occluded vocal tract (SOVT) exercises, pitch slides (sirens), and sustained or sliding fricatives across random pitches to reflect natural speech patterns. The exercises focus on dynamic voice production, emphasising adaptability to varying vocal loads (Guzmán et al., 2013). They primarily involve ascending scales designed to simulate the most demanding portions of the user's daily vocal tasks (Van Puyvelde et al., 2018).

Afternoon routine

The suggested afternoon routine is intended to support recovery and "realignment" after operating with vocal load (tasks and responses) (McDowell et al., 2025). In contrast, this phase begins with SOVT exercises on descending scales at piano dynamics (downward slides: ž, hums, vowel glides, with gradual upward movements kept soft and controlled). To promote airflow release and relaxation while simultaneously providing light resistance, the fish blowing exercise is included, an established method in respiratory and voice therapy for improving exhalatory control and reducing tension (Diaz et al., 2023). After releasing the voice strain, the phase with ascending SOVT exercises at medium dynamics is performed to avoid the reversibility (Akbulut et al., 2019) and maintain the resilience growth (Morton, 2019).

Additional hygiene strategies, such as hydration, vocal rest, or steam inhalation, remain supportive recommendations but are not integrated directly into the morning/afternoon framework (Martin, 2003). By structuring routines in this way, the artefact translates clinical preventative care and pedagogical skill-building into a dual-phase format that aims to deliver long-term protection and functional adaptability for occupational voice users.

Methodological Influences

The creation of the artefact is supported by two overlapping methodological traditions: practice-based research and design-based research (DBR). Practice-based research treats the artefact as both the outcome and a form of inquiry, where knowledge is generated through the process of making (Barrett and Bolt, 2014). This is particularly relevant here, as the training system itself demonstrates how principles from pedagogy and therapy can be combined into a practical tool for occupational voice users.

Design-based research adds structure to this process by emphasising iterative development and the translation of theory into practical solutions (McKenney and Reeves, 2019). Although full testing will take place in Module 6, the present project aligns with the design and prototyping phase of DBR, which focuses on creating interventions that are theoretically grounded and practically relevant (Design-Based Research Collective, 2003).

To drive the artefact's development, the project also draws on educational design research frameworks, which suggest matching what people learn or practice to their real needs and placing it in real-world situations (Anderson and Shattuck, 2012). In this case, occupational voice demands are used as the reference point for structuring the dual-phase routines.

Reflective documentation of design decisions forms part of the methodology, following Schön's (1983) concept of the reflective practitioner, where I'm trying to analyse and apply the professional insight. This should ensure that the artefact is practically useful, transparent, research-driven, and positioned for later evaluation with mixed-methods approaches.

Aims and Objectives

Aim

The aim of this project is to design and develop a dual-phase training artefact that integrates principles of singing pedagogy and clinical voice therapy in order to support occupational voice users - particularly teachers - in preventing and managing vocal fatigue. The artefact seeks to provide an accessible, evidence-informed, and profession-specific tool that enhances vocal resilience, builds sustainable vocal habits, and addresses a significant gap in occupational health practice.

Objectives

- To synthesise theoretical and empirical knowledge from singing pedagogy and clinical voice therapy, identifying overlapping principles and effective strategies that can be adapted into a combined training system. I want to compare useful elements from both and conclude them narratively.
  - Measurable outcome: A literature review mapping shared techniques (e.g., SOVT, breath management, resonance balance) and their application in occupational settings.

- To design a structured, dual-phase training programme containing morning activation and afternoon recovery routines, inserting evidence-based therapeutic and pedagogical exercises tailored to the daily demands of occupational voice use.
  - Measurable outcome: A detailed routine framework with exercise descriptions, sequencing, and recommended durations.

- To develop the artefact into a practical multimedia resource (e.g., a series of instructional video modules supported by written guidance) to ensure accessibility, ease of use, and alignment with real-world occupational contexts.
  - Measurable outcome: A prototype of video-based training modules with accompanying handbook.

- To document and critically reflect on the design process, drawing on practice-based and design-based research methodologies, to ensure transparency, theoretical grounding, and relevance to occupational voice users.
  - Measurable outcome: A reflective design log analysing decision-making, adaptation, and theoretical integration.

- To prepare the artefact for subsequent evaluation, by establishing user-centred criteria for feasibility, usability, and potential effectiveness in reducing vocal fatigue.
  - Measurable outcome: An evaluation framework including proposed methods such as self-report fatigue scales, adherence monitoring, and qualitative feedback.

Expected Learning Outcomes

By completing this project, I expect to:

- Understand and apply theory - gain a clear understanding of how singing pedagogy and clinical voice therapy overlap, and how these principles can be used to prevent and manage vocal fatigue.
- Design a practical artefact - create a structured dual-phase training system (morning activation and vs. afternoon recovery) that is evidence-based and relevant to occupational voice users.
- Improve my research approach - learn how to use research methods that connect academic ideas with real-world practice.
- Reflect on the design process - critically evaluate my design choices, documenting how theory and practice shaped the artefact.
- Plan for impact - prepare an evaluation framework and produce a resource that can be adapted for teachers and other professionals who rely heavily on their voice.

Activities and Assessment Criteria

Planned Activities / Tasks

- Literature review and synthesis: Identify and analyse overlapping principles from singing pedagogy and clinical voice therapy that support vocal efficiency and fatigue prevention.
- Artefact design: Develop a dual-phase (morning activation/afternoon recovery) training system, structuring practical exercises that are adaptable for non-singers and suitable for everyday contexts (e.g., at home, during commutes, or in the shower). Exercises that don't need to be loud, but are effective.
- Artefact development: Produce video-based instructional modules and written guidance, ensuring exercises are easy to follow, discreet, and manageable within a limited time or space.
- Reflective documentation: Keep a design log capturing decisions, challenges, and adaptations made throughout the development process.

- Evaluation preparation: Draft an evaluation framework (to be applied in future study - Module 6) to assess usability, accessibility, and potential effectiveness in reducing vocal fatigue.

Key Resources

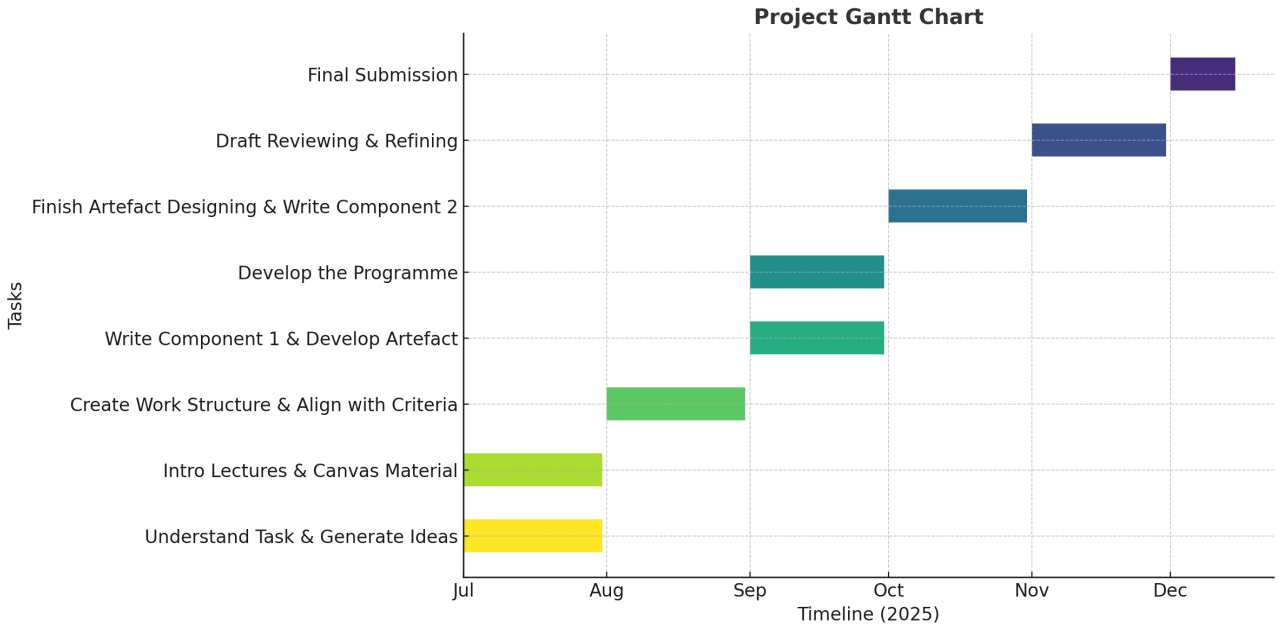
- Academic literature on singing pedagogy, voice therapy, and occupational vocal health.
- Clinical voice therapy exercise protocols (e.g., SOVT, fricatives, respiratory support).
- Digital tools for producing and editing video modules.
- Personal professional insight as a music educator and occupational voice user.

Assessment Criteria

The success of this project will be evaluated against the following criteria:

- Relevance and practicality: The artefact must directly address the needs of occupational voice users, offering exercises that are simple, discreet, and adaptable for non-singers or those with limited practice environments.
- Integration of theory and practice: The artefact should clearly demonstrate how evidence-based therapeutic exercises and singing pedagogy principles are combined into a coherent, strength-training style framework.
- Clarity and accessibility: Training modules and materials should be easy to understand and follow without specialist knowledge, reducing anxiety or barriers to engagement.
- Innovation through combination: The artefact should not aim to “reinvent the wheel” but instead create value by combining established evidence-based methods in a novel, systematic way.
- Reflective rigour: The development process should be documented and critically analysed, demonstrating how theoretical insights and practical considerations informed design choices.
- Readiness for evaluation: The project should produce an artefact and an evaluation framework that can be tested in subsequent research for usability, effectiveness, and impact on vocal fatigue.

Timescales and Review Dates



1.3 Methodology

Rationale for Methodology and Artefact Development Approach

The methodological approach for this project was shaped by both the existing conditions of occupational voice use and the need to ground artefact development in credible, research-informed frameworks. From the very beginning, the project was driven by a day-to-day struggle: the persistent experience of vocal fatigue among professionals whose work depends on sustained speaking (Hunter and Titze, 2010). My planning, therefore, needed to extend beyond theoretical exploration to create an artefact that could be directly implemented by individuals with little to no background in vocal training. This orientation framed my methodological choices, literature review process, and development planning.

Artefact planning began with a realisation that occupational voice users, in contrast to singers, typically lack established habits of daily voice exercise (Roy et al., 2004; Sliwinska-Kowalska et al., 2006; Padmashali, Nayak and Devadas, 2022). While singing pedagogy offers a range of structured routines for breath management, resonance, and vocal efficiency (Clark, 2024), these are often coached in technical language or performance contexts unsuitable for non-singers. On the other hand, clinical voice therapy offers systematic, evidence-based techniques such as semi-occluded vocal tract (SOVT) exercises, vocal function training, and therapeutic breathing methods (Nayebian et al., 2025; Heller-Stark et al., 2024), but these are usually delivered in clinical contexts after problems have emerged (Desjardins et al., 2017). My challenge was to integrate elements from both vocal pedagogy and voice therapy into an artefact that is long-term effective, accessible, and suitable for everyday occupational use.

Inclusion, Exclusion Criteria, Integration of Sources

The literature review informing this project followed a structured but flexible process, consistent with narrative review approaches recommended in applied health and educational research (Greenhalgh, Thorne and Malterud, 2018). Databases including PubMed, Scopus, and Google Scholar were searched, supplemented with discipline-specific repositories such as the *Journal of Voice* and *Journal of Singing*. Key search terms included combinations of “vocal fatigue,” “occupational voice users,” “voice therapy,” “singing pedagogy,” “semi-occluded vocal tract,” “resistance training for voice,” and “vocal resilience.” Searches were focused primarily on the period 2000 - 2025 in order to capture contemporary clinical protocols and pedagogical practices, though seminal texts were included where historically significant.

Inclusion criteria targeted empirical studies, systematic reviews, and clinical protocols relevant to preventative voice care, particularly for professional speakers. Exclusion criteria filtered out clinical studies on populations such as post-surgical patients, which were not directly applicable to occupational voice users. However, I also had to take these studies into consideration, since the training programme must remain

versatile, safe, and inclusive for all occupational voice users, including those recovering from vocal injury, while still being effective in preventing fatigue (Supriya, 2025). Practitioner literature, such as teaching handbooks or clinical protocols, was included based on demonstrated use in practice and helped to gain practical insight into implementation (Brown, 2019). Exclusion criteria also applied to grey literature lacking sufficient evidential grounding, though some forms - professional guidelines and practitioner blogs were considered to contextualise practical relevance (Greenhalgh et al., 2018).

Beyond academic sources, I also had to research the most effective forms of artefact delivery, since accessibility and usability were my essential requirements. This meant considering not only the credibility of content but also its capacity to engage users. I therefore evaluated the user response, including a concise structure with instructions that followed and navigated the intent. I examined existing training resources available on platforms such as YouTube, social media, and voice training apps. A leading example is Cheryl Porter's highly followed singing workouts, which have gained significant popularity online. While this content falls into grey literature, its impact cannot be ignored. It demonstrates how a training programme can achieve reach and adherence by being simple, enjoyable, and presented in an addictive format (Porter, 2023). Porter's approach works because she incorporates well-known, popular songs, builds community engagement, and structures her programme into a complete, results-focused system.

Even though my artefact will not target singers specifically, insights from these popular models helped me to think critically about combining credibility with effectiveness. The challenge is to adapt evidence-based voice therapy and pedagogical strategies into a format that occupational voice users, who may have no prior experience with vocal exercises, can adopt as easily as a fitness routine. The resulting programme, therefore, aims to be practical, accessible, and engaging, translating clinical and pedagogical methods into an exercise routine that is not only preventative but also appealing enough to become a regular, sustainable habit (Witte, Meyer and Martell, 2001; Brannan et al., 2019).

COMPONENT 2

2. 1 Introduction

This section presents a detailed critical review of my artefact: a dual-phase training portfolio designed to address vocal fatigue among occupational voice users by integrating singing pedagogy with clinical voice therapy. The portfolio, which I developed through an iterative process, combines evidence-based exercises into structured morning activation and afternoon recovery routines. My aim was to create an artefact that is simple and effective, scientifically grounded, and, most importantly, adaptable for non-singers in professional contexts (target audience) (Zhou et al., 2025).

The structure of the review is based on Nelson's *Know That, Know How,* and *Know What* model of reflective practice (Archer, 1995; Nelson, 2013). This structure enables me to interlink the reading, learning, and adjustment phases of my design. *Know That* outlines the theoretical and best-practice knowledge informing my decisions, such as the role of semi-occluded vocal tract exercises and structured dual-phase routines. *Know How* reflects on the skills and experience I applied during the artefact's creation, documenting how I adapted therapeutic and pedagogical principles into practical training. *Know What* critically examines the facts and ideas underpinning the artefact, analysing its effectiveness in meeting its aims and objectives.

Alongside this review, I undertake a critical reflection on my developmental journey throughout the module. This includes my progress in synthesising literature, adapting exercises for accessibility, and balancing credibility with effectiveness. The critical review and reflection also serve as a key component of Module 6, evaluating the potential contribution of the artefact to occupational vocal health (Seubert, 2023).

2. 2 Review

1. Know That: Theoretical, Framework, and Best Practice Influences

The development of my artefact, a dual-phase training portfolio designed to prevent and manage vocal fatigue among occupational voice users, was guided by an integration of theoretical principles, conceptual frameworks, and best practice knowledge (Falegnami, 2024). In this section, I critically review the "know-that" foundations of my design, drawing from singing pedagogy, clinical voice therapy, and physiological models of muscular training (Hoch and Sandage, 2018; Benson, 2018). By situating the artefact within these practices, I show the thinking and outcomes behind each design choice, and explain how reflective knowledge shaped its final form.

Vocal Fatigue as a Physiological and Occupational Challenge

The first theoretical influence is the understanding of vocal fatigue as a physiological rather than solely symptomatic condition. Literature consistently describes fatigue as a form of muscular overload, appearing in reduced efficiency, decreased endurance, and therefore compromised fine motor control (Hunter and Titze, 2010). While the laryngeal muscles have demonstrated endurance traits, they require precision and coordination rather than strength in isolation (Alzamendi, 2022). This theoretical perspective shaped my decision to model the artefact on exercise science principles - systematic activation, controlled workload, and structured recovery.

From an occupational standpoint, teachers and other professional voice users are disproportionately vulnerable to fatigue due to sustained vocal load, high background noise, and lack of training (Roy et al., 2004). My artefact covers this gap by integrating short, repeatable routines into the working day. As one extract notes:

"The portfolio splits the training into a morning activation phase and an afternoon recovery phase, each under 15 minutes, to fit effortlessly into occupational contexts such as teaching schedules."

This approach reflects the theory that if fatigue arises from cumulative load, then training must be preventive, sustainable, and adaptable for non-specialists (Al-Hussain, 2024; Deary, 2018).

Physiological Models: Conditioning and Recovery

The physiology of muscle conditioning provided further theoretical grounding (Sandage and Hoch, 2017). In exercise science, structured load followed by recovery improves endurance and prevents strain (Titze and Hunter, 2015). Translating this to voice, the morning routine functions as a warm-up, activating coordination and airflow control, while the afternoon routine functions as a cool-down, resetting the system after the daily vocal load of occupational voice users.

For example, the artefact begins with semi-occluded vocal tract (SOVT) exercises, which lower phonation threshold pressure and optimise vocal fold vibration (Pozzali et al., 2024). In the recovery phase, downward glides and gentle humming provide controlled deactivation, mirroring athletic models of gradual cooldown. Extracted from the afternoon portfolio:

"The session begins with descending SOVT on soft dynamics, followed by the 'fish blowing' exercise to release airflow tension, concluding with limited ascending sirens at medium dynamics."

This structured cycle reflects physiological best practice: gradual activation and controlled recovery support resilience and prevent ineffective adaptation to the regime necessary to build long-term vocal fatigue-resistance results (Nesbitt, 2023).

Theoretical Contributions from Singing Pedagogy

Singing pedagogy provided a parallel framework for structuring the routines. Pedagogical traditions emphasise breath management, resonance tuning, and gradual skill development (Emmons, 1988; Clark, 2024). My artefact integrates these principles while removing technical terminology, ensuring accessibility for non-singers. Furthermore, pedagogical research emphasises the integration of exercises into daily routines rather than isolating them as "extra" tasks (David, 2008). This directly shaped my design philosophy: short, habitual exercises integrated into daily life.

Clinical Voice Therapy: Evidence-Based Preventative Models

Clinical voice therapy provided essential theoretical tools. Preventative strategies such as warm-ups, cool-downs, and vocal hygiene are established practices and post-pathology recovery tools for occupational voice

users (Behrman and Haskell, 2019). Among the most validated interventions are semi-occluded vocal tract techniques, which reduce phonatory effort and improve efficiency (Nayebian, 2025).
In the afternoon routine, I integrated "fish blowing" exercise, which is designed to coordinate respiration and phonation while reducing tension. Extract from the artefact:

"Fish blowing is performed halfway through the recovery session, providing gentle respiratory resistance while simultaneously releasing tension from the vocal tract."

This choice reflects clinical evidence that airflow coordination is critical for recovery and fatigue prevention. By combining pedagogical and therapeutic practices, the artefact addresses both efficiency (pedagogy) and health maintenance (therapy), demonstrating the overlapping yet distinct strengths of both.

Best Practice Influences in Artefact Design

Best practice in both pedagogy and therapy influenced the artefact's function. Clinical protocols often emphasise short, frequent routines to optimise adherence and reduce strain (Rubino, 2024). Similarly, pedagogical models recommend gradual development and integration into existing habits (Lã, 2017). To align with this, I structured the portfolio into dual-phase sessions under 15 minutes each, avoiding long or loud drills. As highlighted in the artefact:

"All exercises are designed for quiet or moderate dynamic levels, ensuring they can be practised in discreet environments such as classrooms or staff rooms."

This reflects best practice for occupational voice users, who often lack access to private practice spaces (Padmashali et al., 2022). By inserting routines into real-world contexts, the artefact keeps both scientific grounding and practice setting versatility.

Reflective and Research Frameworks

At last, my theoretical grounding was supported by reflective and research frameworks. Nelson's (2013) *Research as Practice in the Arts* explains that "know-that" knowledge provides the reflective rationale for design choices. In my case, this meant critically finding the "why" of each exercise. For example, hydration and rest were excluded from the core artefact not because they lack value, but because they do not represent trainable skills (Oliveira et al., 2024).
Schön's (1983) concept of the reflective practitioner also underpinned my process: documenting design decisions, testing them against literature, and adapting where necessary. For example, an early design included extended vocalises, but reflection and literature review showed that shorter, frequent exercises would be safer and more sustainable for non-singers (Fulton, 2007).

Design-based research (McKenney and Reeves, 2019) further strengthened this iterative process. The artefact was shaped as a prototype, grounded in theory but responsive to real-world application, aligning with best practice in educational design.

Implications of Theoretical Foundations

The theoretical knowledge grounding my artefact has several implications. First, by aligning with physiology, the portfolio identifies fatigue as a trainable condition, not simply an occupational risk. Second, by integrating pedagogy and therapy, it bridges the gap between artistic and clinical knowledge, offering non-singers accessible tools traditionally dedicated to specialised contexts. Finally, by including best practice principles of succinctness, accessibility, and integration into daily life, the artefact improves adherence and sustainability. In Nelson's (2013) terms, the "know-that" knowledge ensures that the artefact is not simply practical but explanatory: each exercise is supported by theory, research, and reflective analysis. This foundation ensures credibility, positions the artefact for future evaluation, and forms its potential impact on occupational vocal health.

2. Know How: Procedural Knowledge and Practical Application

The "know-how" dimension of Nelson's framework centres on procedural knowledge: the embodied, practical, and often tacit skills employed during artefact creation (Nelson, 2013). While "know-that" addressed the theoretical rationale underpinning my design, this section critically examines the methods and processes by which those theories were executed. My artefact, a dual-phase training portfolio for occupational voice users, was not only informed by literature but shaped through iterative practice, adaptation, and reflection. This journey is central to the artefact's development and to my own growth as a practitioner-researcher.

Translating Theory into Practice

The earliest challenge was translating theoretical principles from voice science into practical, user-friendly exercises. For instance, semi-occluded vocal tract (SOVT) tasks were consistently highlighted in literature as effective for reducing phonatory effort (Asadollahpour et al., 2025). However, my task was to select specific SOVT gestures that could be performed discreetly, briefly, and without specialist equipment. After experimenting with straw phonation and voiced fricatives, I included both in the morning sequence. As my artefact notes:

"The morning session begins with straw humming, followed by voiced fricatives on /v/ and /ʒ/ in short, speech-like bursts."

This decision reflects "know-how" in action: adapting clinical tools into accessible, real-world exercises. My experience as a teacher reinforced the need for discretion; straw phonation with water bubbling, though effective, was excluded due to its impracticality in classroom environments.

Iterative Development and Adjustment

A key methodological influence was design-based research, which emphasises iterative enhancement (McKenney and Reeves, 2019). My artefact developed through phases of testing, reflection, and adjustments. For example, in early drafts, I included extended vocalises (sustained scales). However, in practice, these demanded time, privacy, and higher volume, creating barriers to adherence. Reflecting on this, I replaced long scales with sliding sirens and short pitch glides. Extract from the revised morning phase:

"Sirens are limited to 3 - 4 slides across comfortable pitch ranges, with no more than 30 seconds per set."

This modification proves how the testing - trying exercises myself and considering occupational contexts, guided refinement.

Embodied Knowledge and Professional Insight

My decisions were also informed by embodied knowledge developed through years of teaching and personal experience with vocal fatigue. For example, I knew that after a long teaching day, recovery routines needed to feel restorative rather than demanding. Therefore, the afternoon sequence was designed to emphasise downward movements and airflow release:

"The afternoon recovery begins with descending SOVT slides at piano dynamics, followed by gentle hums and the fish blowing technique."

My lived experience understanding of what feels "possible" after heavy vocal use shaped the routine's pacing and intensity. Schön's (1983) reflective practitioner model captures this process: drawing on lived experience to make procedural judgments that are later tested against theory.

Balancing Pedagogical and Clinical Models

Another practical challenge was balancing singing pedagogy and voice therapy approaches. Pedagogical routines often emphasise technical development and artistry, while therapy efficiency and prevention (Gerhard, 2016). I found that solely pedagogical drills (e.g., resonance tuning) risked isolating non-singers, while only therapeutic routines could feel clinical and repetitive. My solution was blended exercises: pedagogical in design but framed as preventative tools. For example:

"Pitch slides ('sirens') are included not for range expansion, as in singing, but to realign laryngeal flexibility and reduce stiffness after occupational use."

This demonstrates "know-how" in reframing traditional tasks to suit new contexts.

Structuring the Artefact as a Portfolio

A further decision was to present the artefact as a portfolio of routines rather than a linear programme. Literature suggests that occupational users are more likely to adhere to modular, flexible resources (Rodríguez-Dueñas, 2023). This meant designing the portfolio with distinct morning and afternoon units, each independent and under 15 minutes.

"Users may complete the morning and afternoon sessions independently, with guidance on duration and repetition included in the portfolio."

Creating the portfolio format required not just selecting exercises but organising them into visual, written, and multimedia formats. This ensured clarity of sequencing, timing, and intended outcomes, so the artefact has usability potential.

Practical Constraints and Adaptations

Procedural knowledge also meant recognising constraints. Teachers and other occupational users often lack privacy, time, or equipment. I therefore excluded exercises that were too noisy (extended loud phonation), time-intensive (long scales), or equipment-dependent (resonance tubes in water). This pragmatic filtering was a crucial part of the design process.

One extract highlights this adaptation:

"All exercises are designed for moderate volume, requiring no special equipment and minimal space, ensuring usability in classrooms, offices, or even commutes."

Here my insights when designing the portfolio aligned with real-world constraints, demonstrating how "know-how" bridges theory and practice.

Evaluating Procedural Outcomes

"Know-how" includes assessing the effectiveness of procedures in achieving aims. My goal was a preventative, accessible artefact. Success was measured against criteria such as whether exercises could be performed in under 15 minutes or if they reflected both pedagogical and therapeutic principles. By these measures, the final portfolio demonstrated alignment with objectives. Extracts such as

"Afternoon sessions are limited to 10 minutes, with optional extensions only for advanced users", demonstrates intentional procedural structuring to build the routine habits and therefore support the regular and gradual muscle work.

Implications of Procedural Knowledge

The procedural journey reveals several key insights. First, the artefact's effectiveness lies not only in the exercises chosen but in how they were adapted, sequenced, and contextualised. Second, embodied practitioner knowledge was as influential as academic theory in shaping decisions. Third, iterative design and reflection ensured that procedural adjustments were grounded in both practicality and evidence.

Therefore, the "know-how" underpinning my artefact is not a static set of skills but a dynamic process of translation, adaptation, and reflection. It demonstrates that procedural knowledge in voice training is naturally hybrid - it blends a theoretical base with pragmatic adjustments, always tested against the lived realities of occupational voice use.

3. Know What: Factual and Conceptual Knowledge in the Artefact

Where the "know-that" dimension explored the theoretical rationale and the "know-how" outlined the procedural processes behind the artefact, the "know-what" centres on factual and conceptual knowledge embedded in the design. Nelson (2013) describes "know-what" as the articulation of concepts and facts that anchor creative artefacts within disciplinary knowledge. In my project, these concepts are expressed through the dual-phase training routines, the principles of voice physiology underpinning them, and the practical knowledge they communicate to occupational voice users. This section identifies these embedded concepts, examines their implications, and critically evaluates the degree to which the artefact fulfils its aims and objectives.

The Concept of Vocal Fatigue

At the heart of the artefact is the concept of vocal fatigue as a measurable, preventable condition. Research has conceptualised vocal fatigue as comparable to muscular fatigue, characterised by reduced vocal endurance, increased effort, and performance decline (Nanjundeswaran, VanSwearingen and Verdolini Abbott, 2017). The artefact represents this knowledge by presenting fatigue not as inevitable but as manageable through preventative routines.

For example, in the portfolio introduction:

"This training resource is designed to delay the emergence of vocal fatigue and restore vocal function after occupational load, using evidence-based methods that strengthen resilience rather than depending only on rest."

This positions the artefact as an outcome of the conceptual change from reactive treatment (rest after fatigue) to preventative care (Epstein, Remacle and Morsomme, 2011).

Dual-Phase Training as a Conceptual Framework

The most specific conceptual structure in the artefact is the dual-phase design: a morning activation and an afternoon recovery. This directly translates physiological concepts of conditioning and recovery into practical routines (Saxon and Berry, 2009). The factual knowledge here is twofold: the morning routines are necessary to "prime" the system, increasing efficiency before vocal demand, and recovery routines are equally necessary to "reset" the system and prevent cumulative strain.

Pedagogical Concepts: Gradual Development and Accessibility

The artefact also includes pedagogical concepts of incremental skill-building and accessibility. Heman-Ackah et al. (2008) emphasise that sustainable voice use requires gradual progression. This is seen in the morning routine's sequencing from gentle tasks to dynamic phonation, reflecting a pedagogical fact: muscles and coordination adapt best when gradually challenged.

Accessibility is also a conceptual anchor. Unlike singer-focused routines, the artefact is designed for non-singers.

Critical Examination of Embedded Knowledge

While the artefact integrates substantial knowledge, critical examination reveals limitations. For instance, hydration and rest are mentioned only as supplementary strategies, though they are strongly evidenced in voice health literature (Weston and Schneider, 2023). Their omission from the core routines reflects a conceptual narrowing: focusing only on trainable exercises. Another limitation lies in generalisation. Although exercises are evidence-based, their effectiveness for all occupational users is untested. Individual variability in physiology and pathology means that factual knowledge in the artefact may not be universally applicable (Remacle et al., 2017), and further adjustments must be made for specific groups. While the artefact embeds concepts of accessibility and discretion, it suspects users will adhere consistently. Adherence, however, is often difficult to maintain in preventative health routines (Barlett, 2002). Applying the habit-formation strategies conceptually strengthens the artefact, but real-world adherence may differ.

Broader Implications of Embedded Concepts

The factual and conceptual knowledge embedded in the artefact has implications beyond individual use. By bridging pedagogy and therapy, the portfolio models how interdisciplinary approaches can be synthesised into practical resources. Conceptually, it challenges the divide between clinical and artistic practices, showing that occupational voice users benefit from both (Shewell and Sansom, 2024). Moreover, by embedding prevention as a guiding principle, the artefact aligns with broader occupational health goals:

reducing absenteeism, enhancing productivity, and sustaining professional longevity (Harrison and Dawson, 2016). These implications reflect the power of "know-what" not only to inform artefact content but also to shape its potential impact (Houkes, 2006).

Conclusion and Future Recommendations

This project demonstrates that a dual-phase, evidence-informed portfolio can translate core insights from singing pedagogy and clinical voice therapy into a practical, preventative resource for occupational voice users. The literature consistently supports low-impact resistance tasks to reduce phonatory effort, paired with brief, frequent routines to strengthen efficiency and commitment to the routine (Brown, 2017; Lawrence, 2022). Framing the day around activation and recovery enacts conditioning and realignment principles from voice physiology (Nesbitt, 2023) while remaining accessible for non-singing professionals. The developed portfolio incorporates these concepts in short exercises and user-friendly explanations, aligning utility with credibility (Garcia, 2020).

There are limitations to this artefact creation. For now, it is only design-led and has not yet undergone empirical testing; generalisability across diverse occupational users and contexts is not proven. The review balanced peer-reviewed and practitioner sources; however, narrative synthesis risks bias, and some recommendations (e.g., habit-building strategies) are extrapolated from adherence research rather than voice-specific RCTs. The portfolio is preventative, not a substitute for individualised therapy. Next steps should be to test and prove the effectiveness. To conduct a pilot with teachers using pre-/post Vocal Fatigue Index and simple acoustic/aerodynamic markers, plus usability and adherence tracking (Nanjundeswaran, VanSwearingen and Verdolini Abbott, 2012).

Evaluation

There were several positive outcomes from this process:

- My ability to synthesise multidisciplinary knowledge improved significantly. I drew from pedagogy, physiology, therapy, and occupational health.
- Developing the artefact forced me to think practically and creatively: theoretical knowledge alone was insufficient without adaptation for real-world contexts.
- The dual-phase structure proved to be a strong organising principle, praised for aligning with both exercise science and clinical best practice.

However, there were also challenges and limitations:

- My artefact remains untested in empirical settings; its effectiveness is hypothetical.
- Some knowledge gaps persisted, particularly around habit formation strategies and adherence in occupational users.
- I occasionally struggled to balance scientific credibility with simplicity: explaining too much risked overwhelming users, while oversimplification risked losing rigour.

Overall, the experience was both rewarding and demanding: it highlighted the tension between academic thoroughness and applied usability.

2. 3 Critical Reflection

Introduction

Critical reflection allows me to situate my artefact design not only within theory but also within my personal development throughout the module. I have chosen Gibbs' Reflective Cycle (1988) as a framework, as it provides a structured pathway for examining my decisions, emotions, and learning progression. This reflection reviews my development from the early literature review through to the final portfolio, critically assessing how my perspectives evolved, the challenges I encountered, and the skills I developed.

Description

At the outset of this module, I identified occupational vocal fatigue as an area of both professional and personal relevance. Teachers, like myself, often face extended vocal load without access to tailored preventative resources. The decision to create a dual-phase portfolio emerged after reviewing literature on vocal fatigue, muscle conditioning, and therapeutic models. The design journey included three key phases:

1. Exploration of literature in pedagogy, therapy, and physiology.
2. Iteration of exercise routines through testing and reflective adjustment.
3. Translation into a user-friendly, professional artefact.

During this process, I frequently returned to Nelson's *Know That, Know How, Know What* framework to anchor theoretical, procedural, and conceptual insights. This gave structure to my project but also forced me to confront gaps in my own knowledge and assumptions.

Feelings

Initially, I felt uncertainty about integrating pedagogy with clinical therapy. I questioned whether I had the authority to adapt clinical tools for non-singers. However, as I engaged with the literature, I began to feel more confident in grounding decisions in peer-reviewed evidence.

At times, I also experienced frustration: certain exercises I had used successfully in practice did not align neatly with the literature, or they seemed impractical for occupational users. For example, water bubbling is highly effective physiologically but impractical in a classroom setting. These tensions created moments of doubt but also pushed me to refine and justify my choices critically. I believe that singing pedagogy can bring effectiveness to the voice therapy applications. There are a lot of efforts in both academic and non-academic worlds; however, the gap may lie in combining these officially. The final effective programmes require a lot of testing.

By the end of the project, my feelings had shifted to pride and ownership. Seeing the final artefact in a clear visual portfolio reassured me that my learning had not only deepened academically but also materialised in a tangible resource that could benefit others.

Analysis

Gibbs' cycle encourages moving beyond description into deeper learning. Several theoretical frameworks shaped my analysis of decisions:

- Experiential Learning (Kolb, 1984): My process mirrored Kolb's cycle: concrete experimentation (testing exercises), reflective observation (journaling outcomes), abstract conceptualisation (linking to theory), and active experimentation (refining routines). This iterative approach strengthened my confidence as a practitioner-researcher.
- Reflective Practitioner (Schön, 1983): Schön emphasises reflection-in-action, thinking on your feet during design. For example, when I trialled lip trills in the afternoon routine, I noticed immediate issues of time inefficiency and user accessibility. This led me to replace them with fish blowing, which aligned better with both clinical evidence and occupational practicality.
- Nelson's Framework (2013): Applying *Know That, Know How, and Know What* gave coherence across reflection, review, and portfolio design. It helped me articulate why I selected each exercise, how I adapted it procedurally, and what knowledge it communicates to users.
- Adherence Research (Rubino and Abbott, 2024): My reflection revealed that designing effective routines was not just about physiology but about behavioural science. Embedding short, repeatable tasks improved adherence potential. This insight broadened my scope, teaching me to think beyond the vocal mechanism to human behaviour.

These analyses highlight my progression: from seeing the artefact as a set of "exercises" to understanding it as a knowledge-translation tool situated in occupational, behavioural, and reflective practice.

Conclusion

Through reflection, I recognise that my development involved both strengths and limitations. I succeeded in creating a portfolio that is theoretically justified, procedurally sound, and conceptually rich. I grew in my ability to integrate cross-disciplinary knowledge and present it in an accessible way.

However, I also acknowledge missed opportunities. I could have incorporated pilot testing, which would have strengthened validity. I could have engaged stakeholders (teachers, clinicians) earlier in co-design. And while I focused strongly on physiology and pedagogy, I touched only lightly on the psychological dimensions of voice use (stress, confidence), which are relevant in occupational settings.

Action Plan

Looking forward, my action plan involves several directions:

- Pilot Testing: Trial the artefact with teachers using pre- and post-measures (e.g., Vocal Fatigue Index, acoustic markers).
- Stakeholder Engagement: Collaborate with speech-language therapists and occupational voice users to refine exercises and language.
- Behavioural Integration: Build adherence-support tools (e.g., an app with reminders and progress tracking).
- Expand Scope: Explore complementary interventions, such as inspiratory muscle training (Wingate et al., 2024) or mindfulness-based strategies.
- Long-Term Development: Position the portfolio as part of a larger educational resource for occupational health.

By following this plan, I will continue to evolve as a reflective practitioner, translating evidence into practice in ways that are both credible and usable.

Closing Statement

This critical reflection demonstrates that my development throughout the module was not linear but cyclical, informed by both successes and challenges. Using Gibbs' framework revealed how my confidence, criticality, and adaptability have grown. I leave the module not only with a finished artefact but also with an enhanced capacity to integrate research, practice, and reflection in future projects.

Reference List

Kristiansen, J. et al. (2019). A study of classroom acoustics and school teachers' noise exposure, voice load and speaking time during teaching, and the effects on vocal and mental fatigue development. *Int Arch Occup Environ Health* 87, 851–860. https://doi.org/10.1007/s00420-014-0927-8

Hunter, E. J., Titze, I. R. (2010). Variations in intensity, fundamental frequency, and voicing for teachers in occupational versus nonoccupational settings. *Journal of Speech, Language, and Hearing Research,* 53(4), 862–875.

Nanjundeswaran, C. et al. (2015). Vocal Fatigue Index (VFI): Development and validation. *Journal of Voice,* 26(4), 433–440.

Martinez et al., (2021). Vocal parameters, muscle palpation, self-perception of voice symptoms, pain, and vocal fatigue in women with muscle tension dysphonia. In *CoDAS* (Vol. 33, p. e20200035). Sociedade Brasileira de Fonoaudiologia.

Sliwinska-Kowalska, M. et al. (2006). The prevalence and risk factors for occupational voice disorders in teachers. *Folia Phoniatrica et Logopaedica,* 58(2), 85–101.

Zadeh, M. S. M. et al. (2024). Effect Of Vocal Function Exercises on the Voice Handicap Index, Vocal Fatigue Index, and Number Of Vocal Fatigue Symptoms in Bank Workers: Single-Blinded Randomised Controlled Trial. Indian Jou*rnal of Otolaryngology and Head and Neck Surgery,* 76(5), 3905–3913.

Verdolini, K., Ramig, L. O. (2001). Review: Occupational risks for voice problems. *Logopedics Phoniatrics Vocology,* 26(1), 37–46.

Roy, N. et al. (2004). Voice disorders in teachers and the general population: Effects on work performance, attendance, and future career choices. *Journal of Speech, Language, and Hearing Research,* 47(2), 281–293.

Emmons, S. (1988). Breathing for singing. *Journal of Voice,* 2(1), 30–35. https://doi.org/10.1016/S0892-1997(88)80055-9

Al-Hussain O. (2024). Assessing the effectiveness of voice therapy techniques in treating dysphonia. *Cureus Journal of Medical Science,* 16(6), e62041. https://pmc.ncbi.nlm.nih.gov/articles/PMC11235395/

Sandage M. J. and Smith A. G. (2017). Muscle Bioenergetic Considerations for Intrinsic Laryngeal Skeletal Muscle Physiology. *Journal of Speech, Language and Hearing Research,* 60(5), 1254–1263.

Alzamendi G. A. et. al. (2022). Triangular body-cover model of the vocal folds with coordinated activation of the five intrinsic laryngeal muscles. *The Journal of the Acoustical Society of America*, 151(1), 17-30. https://doi.org/10.1121/10.0009169

Kang, J. et al. (2020). The therapeutic effects of straw phonation on vocal fatigue. *Laryngoscope,* 130(11), E674–E679. https://pubmed.ncbi.nlm.nih.gov/31971264/

Kapsner-Smith M. R. et al. (2015). A randomised controlled trial of two semi-occluded vocal tract voice therapy protocols. *Journal of Speech, Language, and Hearing Research,* 58(3), 535–549. https://pmc.ncbi.nlm.nih.gov/articles/PMC4610291/

Yilmaz C. et al. (2025). Maximising phonation: impact of inspiratory muscle strengthening on vocal durations and pitch change. *BMC Pulmonary Medicine,* 25(15). https://bmcpulmmed.biomedcentral.com/articles/10.1186/s12890-024-03471-2

Keltz, A. and McHenry, M. (2022). Steam and/or Semi-occluded Vocal Tract Exercise as Morning Vocal Warm-up Strategy. *Journal of Voice,* 36(5), 734.e7-734.e13.

da Silva, V. M., de Lima, M. L. L. T. and Mendonça Guimarães, N. M. (2024). Health actions and occupational vocal conservation: How are they being implemented? *Revista Brasileira de Medicina do Trabalho*, 22(1), e2022961. https://doi.org/10.47626/1679-4435-2022-961

David, M., 2008. *The new voice pedagogy*. Bloomsbury Publishing PLC.

Rodriguez, L.E., 2014. Analysing adherence risk in voice clients: a speech language pathologist's guide (Doctoral dissertation).

Guzmán, M., Castro, C., Testart, A., & Muñoz, D. (2013). Laryngeal and vocal tract adjustments in different semi-occluded vocal tract exercises: A preliminary study. *Journal of Voice, 27*(6), 710–716.

Van Puyvelde et al. (2018). Voice stress analysis: A new framework for voice and effort in human performance. *Frontiers in psychology*, *9*, p.1994.

McDowell, S., Morrison, R., Mau, T. and Shembel, A.C. (2025). Clinical characteristics and effects of vocal demands in occupational voice users with and without primary muscle tension dysphonia. *Journal of Voice*, *39*(2), pp.448-456.

Diaz, J.A. et al. (2023). Preliminary perceptual findings of singing after flow phonation voice exercises for singers in training. *Journal of Voice*.

Akbulut, S. et al. (2019). Rehabilitation and prognosis of voice disorders. In *Phoniatrics I: Fundamentals–Voice Disorders–Disorders of Language and Hearing Development* (pp. 435-536). Berlin, Heidelberg: Springer Berlin Heidelberg.

Morton, M.E. (2019). Vocal Function Exercises for Normal Voice: The Effects of Maximally Sustained Phonation.

Martin, S.P. (2003). An exploration of factors which have an impact on the vocal performance and vocal effectiveness of newly qualified teachers/lecturers (Doctoral dissertation, University of Greenwich).

Barrett, E. and Bolt, B. (2014). Practice as research: Approaches to creative arts enquiry. I.B. Tauris.
McKenney, S., & Reeves, T. C. (2019). *Conducting educational design research* (2nd ed.). Routledge.

Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher, 32*(1), 5–8. https://doi.org/10.3102/0013189X032001005

Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational Researcher, 41*(1), 16–25. https://doi.org/10.3102/0013189X11428813

Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.

Hunter, E. J. and Titze, I. R. (2010). Variations in intensity, fundamental frequency, and voicing for teachers in occupational versus nonoccupational settings. *Journal of Speech, Language, and Hearing Research, 53*(4), 862–875.

Roy, N. et al. (2004). Voice disorders in teachers and the general population: Effects on work performance, attendance, and future career choices. *Journal of Speech, Language, and Hearing Research, 47*(3), 542–551.

Sliwinska-Kowalska, M., et al. (2006). Vocal load and the prevalence of voice disorders in teachers. *Folia Phoniatrica et Logopaedica, 58*(2), 85–101.

Padmashali, S., Nayak S. and Devadas U. (2022). Prevalence of vocal fatigue and associated risk factors in university teachers. *Journal of Voice, 25*(4), 507–514.

Clark, T. J. (2024) *Vocal pedagogy in 21st century music education*. Doctoral Dissertations and Projects, Doctoral 7379. Liberty University. Available at: https://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=7379&context=doctoral (Accessed: 18 October 2025).

Nayebian R. et al. (2025, in press), Multidimensional Comparison of Immediate Effect of Semi-Occluded Vocal Tract Exercises and Vocal Facilitating Techniques on Vocal Function of Speech-Language Pathologists With Vocal Fatigue: A Randomised Clinical Trial, *Journal of Voice*.

Heller-Stark, A., et al. (2024). Comparative study of two semi-occluded vocal tract protocols: Flow-resistant tube vs. Lessac-Madsen resonant voice therapy. *Journal of Voice,* 67 (11), pp. 4275-4287.

Desjardins M. et al. (2017), A Systematic Review of Voice Therapy: What "Effectiveness" Really Implies, *Journal of Voice,* 31(3), pp. 392.e13-392.e32.

Greenhalgh, T., Thorne, S. and Malterud, K. (2018). Time to challenge the spurious hierarchy of systematic over narrative reviews? *European Journal of Clinical Investigation*, *48*(6), e12931. https://doi.org/10.1111/eci.12931

Supriya, D. (2025) *Advances in voice therapy: Managing vocal cord disorders in professional voice users. Scholar's Digest: Journal of Otolaryngology (ENT),* 1(1), pp. 119–145. Available at: https://scholarsdigest.org.in/index.php/sdjot (Accessed: 18 October 2025).

Brown D. A. (2019), Review of the PubMed PICO Tool: Using Evidence-Based Practice in Health Education. *Health Promotion Practice*. 21(4), pp. 496-498. doi:10.1177/1524839919893361 (Accessed: 20 September 2025)

Porter, C. (2023) *Cheryl Porter Vocal Method* [YouTube channel]. Available at: https://www.youtube.com/user/cherylportermusic (Accessed: 20 September 2025).

Witte, K., Meyer, G. & Martell, D. (2001) *Effective Health Risk Messages: A Step-By-Step Guide*. Thousand Oaks, CA: SAGE. Available at: https://books.google.co.uk/books?id=vH2Qs2J4s5IC (Accessed: 18 October 2025).

Brannan *et al*. (2019), Moving healthcare professionals – a whole system approach to embed physical activity in clinical practice. *BMC Med Educ* 19 (84). https://doi.org/10.1186/s12909-019-1517-y (Accessed: 12 October 2025).

Guzmán, M. et al. (2013). Laryngeal and vocal tract adjustments in different semi-occluded vocal tract exercises: A preliminary study. *Journal of Voice, 27*(6), 710–716.

Zhou, Z. et al. (2025). Knowledge, attitude, and practice toward vocal fatigue among occupational voice users: a cross-sectional study. *BMC Public Health*, 73. https://doi.org/10.1186/s12889-024-21218-w (Accessed: 25 October 2025).

Archer, B. (1995). The nature of research. *Co-Design Journal, 2*(11), 6-13.

Nelson, R. (2013). Practice as research in the arts: Principles, protocols, pedagogies, resistances. Palgrave Macmillan.

Seubert, L. et al. (2023). Critical reflection and critical reflexivity as core processes for critical WOP: Precarious employment as an example, *Applied Psychology*, 72(1), pp. 106-125. https://doi.org/10.1111/apps.12424 (Accessed: 25 October 2025).

Falegnami, A. et al. (2024). Defining conceptual artefacts to manage and design simplicities in complex adaptive systems, *Heliyon*, 10(e41033). doi:10.1016/j.heliyon.2024.e41033 (Accessed: 26 October 2025).

Hoch, M. and Sandage, M. J. (2018). Exercise Science Principles and the Vocal Warm-up, *Journal of Voice*, 32(3), pp. 328-333. doi:10.1016/j.jvoice.2017.03.019 (Accessed: 26 October 2025).

Benson, E.A. (2018) 'Functional Training for All Styles', *Journal of Singing*, 74(5), pp. 515-523. Available at: https://www.jstor.org/stable/26502682 (Accessed: 26 October 2025).

Hunter, E. J., & Titze, I. R. (2010). Variations in intensity, fundamental frequency, and voicing for teachers in occupational versus nonoccupational settings. *Journal of Speech, Language, and Hearing Research, 53*(4), 862–875.

Alzamendi, G.A. et al. (2022) 'Triangular body-cover model of the vocal folds with coordinated activation of the five intrinsic laryngeal muscles', *Journal of the Acoustical Society of America*, 151(1), p.17. doi: 10.1121/10.0009169 (Accessed: 26 October 2025).

Roy, N. et al. (2004). Voice disorders in teachers and the general population: Effects on work performance, attendance, and future career choices. *Journal of Speech, Language, and Hearing Research, 47*(3), 542–551.

Deary, V. et al. (2018) 'A psychosocial intervention for the management of functional dysphonia: complex intervention development and pilot randomised trial', *Pilot and Feasibility Studies*, 4, article number 46. doi:10.1186/s40814-018-0240-5 (Accessed: 26 October 2025).

Al-Hussain, O.H. (2024) 'Assessing the effectiveness of voice therapy techniques in treating dysphonia: An otolaryngological review', *Cureus*, 16(6), e62041. doi: 10.7759/cureus.62041 (Accessed: 26 October 2025).

Sandage, M.J. and Hoch, M. (2017). Exercise physiology: perspective for vocal training. In: R.T. Sataloff, ed., Voice Science, 2nd ed. San Diego: Plural Publishing, pp. 271–290.

Nesbitt, N., 2023. *Exercise Science and the Singing Voice*. Doctor of Music thesis, Jacobs School of Music, Indiana University. Available at: https://scholarworks.iu.edu/iuswrrest/api/core/bitstreams/3d91e2a6-c878-424c-b48c-321a97d9e4c9/content (Accessed: 31 October 2025).

Pozzali I. et al. (2024). Effectiveness of Semi-Occluded Vocal Tract Exercises (SOVTEs) in patients with dysphonia: a systematic review and meta-analysis. *Journal of Voice*, 38(1), pp. 245.e18–245.e35. doi: 10.1016/j.jvoice.2021.06.009.

Clark, T.J., 2024. *Harmonizing Voices: Vocal Pedagogy in 21st Century Music Education*. Doctor of Education project, Liberty University. Available at: https://digitalcommons.liberty.edu/doctoral/6320 (Accessed: 31 October 2025).

Emmons, S. (1988). *Breathing for singing*. *Journal of Voice*, 2(1), pp.30-35. DOI: 10.1016/S0892-1997(88)80055-9.

Hampton, M.E. and Acker, B. (2000). *The Vocal Vision: Views on Voice*. Lanham, MD: Rowman & Littlefield Publishers.

Nix, J., 2017. *Best Practices: Using Exercise Physiology and Motor Learning Concepts in the Voice Studio*. *Journal of Singing – On Point*, 74(2), pp.215-222. Available at: https://www.nats.org/_Library/JOS_On_Point/JOS-074-2-2017-215_-_Best_Practices-Exercise_Physiology_-_Nix.pdf (Accessed: 31 October 2025).

David, M. (2008). *The New Voice Pedagogy*. 2nd ed. London: Bloomsbury Publishing.

Behrman, A. and Haskell, J. (2019). Exercises for Voice Therapy, Third Edition. San Diego: Plural Publishing.

Nayebian, R. et al. (2025) 'Multidimensional comparison of immediate effect of semi-occluded vocal tract exercises and vocal facilitating techniques on vocal function of speech-language pathologists with vocal fatigue: A randomised clinical trial', *Journal of Voice*, online ahead of print. doi:10.1016/j.jvoice.2025.01.026.

Rubino, M. (2024) 'Scoping Review of Voice Therapy Adherence', *Journal of Voice*, [online ahead of print]. doi: 10.1016/j.jvoice.2021.06.009.

Lã, F.M.B. (2017) 'Towards evidence-based practices in voice pedagogy', *Revista de Logopedia, Foniatría y Audiología*, 37(4), pp. 180-187. doi: 10.1016/j.rlfa.2017.07.002.

Padmashali, S., et al. (2022). Prevalence of vocal fatigue and associated risk factors in university teachers. *Journal of Voice, 25*(4), 507–514.

Oliveira, P. et al. (2024) 'Vocal training in healthy individuals: a scoping review', *Journal of Voice*, online ahead of print. doi:10.1016/j.jvoice.2022.03.004.

Fulton, K. S. (2007) *Vocal efficiency in trained singers vs. non-singers*. Dissertation (Master's or Doctoral), Brigham Young University. Available at: https://www.proquest.com/openview/2eaf8c37e791361e0c61d018c022a2a0/1?pq-origsite=gscholar&cbl=18750&diss=y (Accessed: 1 November 2025).

McKenney, S. and Reeves, T. C. (2019). *Conducting educational design research* (2nd ed.). Routledge.

Asadollahpour, F. et al. (2025) 'Investigating the effect of semi-occluded vocal tract training with a free-end tube on acoustic characteristics and glottal performance in dysphonic adults: a systematic review', *Journal of Voice*. Advance online publication. doi:10.1016/j.jvoice.2025.01.010.

Gerhard, J. (2016) 'A Review of Training Opportunities for Singing Voice Rehabilitation Specialists', *Journal of Voice*, 30 (3), pp. 329–333. doi:10.1016/j.jvoice.2015.03.020.

Rodríguez-Dueñas, W.R. et al. (2023) 'How can technology assist occupational voice users?', *Disability and Rehabilitation: Assistive Technology*, 18(4), pp. 369-377. doi: 10.1080/17483107.2020.1855264.

Nanjundeswaran, C., VanSwearingen, J. & Verdolini Abbott, K. (2017) 'Metabolic mechanisms of vocal fatigue', *Journal of Voice*, 31 (3), pp. 378.e1–378.e11. doi: 10.1016/j.jvoice.2016.09.014.

Epstein, R., Remacle, A. & Morsomme, D. (2011) 'From reactive intervention to proactive prevention: The evolution of occupational dysphonia', *Perspectives on Voice and Voice Disorders*, 21(2), pp. 48–55. doi:10.1044/vvd21.2.48.

Saxon, K.G. & Berry, S.L. (2009) 'Care of the Professional Voice: Vocal Exercise Physiology: Same Principles, New Training Paradigms', *Journal of Singing – The Official Journal of the National Association of Teachers of Singing*, 66(1), pp. 51–57.

Heman-Ackah, Y.D., Sataloff, R.T., Hawkshaw, M.J. & Divi, V. (2008) 'Care of the Professional Voice: How Do I Maintain Longevity of My Voice?', *Journal of Singing – The Official Journal of the National Association of Teachers of Singing*, 64(4), pp. 467–472.

Weston, Z. & Schneider, S.L. (2023) 'Demystifying Vocal Hygiene: Considerations for Professional Voice Users', *Current Otorhinolaryngology Reports*, 11, pp. 387–394. doi: 10.1007/s40136-023-00494-x.

Remacle, A., Petitfils, C., Finck, C. & Morsomme, D. (2017) 'Description of patients consulting the voice clinic regarding gender, age, occupational status, and diagnosis', *European Archives of Oto-Rhino-Laryngology*, 274(3), pp. 1567-1576. doi:10.1007/s00405-016-4332-7.

Bartlett, J.A. (2002) 'Addressing the Challenges of Adherence', *Journal of Acquired Immune Deficiency Syndromes*, 29(Suppl 1), pp. S2–S10. doi: 10.1097/00126334-200202011-00002.

Shewell, C. & Sansom, R. (2024) Voice Work: Art and Science in Changing Voices. 2nd edn. Chichester: John Wiley & Sons.

Harrison, J. & Dawson, L. (2016) 'Occupational health: meeting the challenges of the next 20 years', *Safety and Health at Work*, 7(2), pp. 143-149. doi:10.1016/j.shaw.2016.02.002.

Houkes, W. (2006) 'Knowledge of artefact functions', *Studies in History and Philosophy of Science Part A*, 37(1), pp. 102–113. doi: 10.1016/j.shpsa.2005.12.005.

Brown, M. S. (2017) *Vocal Function Exercises for Normal Voice: With and Without Semi-Occlusion*. MSc Thesis, University of Kentucky. Available at: https://uknowledge.uky.edu/commdisorders_etds/11/ (Accessed: 2 November 2025).

Lawrence, K. (2022) *Vocal Athleticism: An Exploration of Exercise Physiology Principles in the Voice Studio*. MM Thesis. Belmont University, Nashville. Available at: https://repository.belmont.edu/music_theses/6/ (Accessed: 2 November 2025).

Garcia, F. et al. (2020) 'Multiobjective approach to portfolio optimization in the light of the credibility theory', *Technological and Economic Development of Economy*, 27(5), pp. 1165-1186. doi:10.3846/tede.2020.13189.

Nanjundeswaran, C., VanSwearingen, J. & Verdolini Abbott, K. (2012) 'Preliminary data on prevention and treatment of voice problems in teachers: Minimalistic vocal health programme', *Journal of Voice*, 26(6), pp. 816.e1-816.e12. doi:10.1016/j.jvoice.2012.04.008

Belsky, M.A. (2023) 'Phonation Resistance Training Exercises (PhoRTE) With High Vocal Intensity and Expiratory Muscle Strength Training for Voice Improvement', *Journal of Voice*, 37(2), pp. 217–225. doi: 10.1016/j.jvoice.2021.100 771.

Gibbs, G. (1988). Learning by doing: A guide to teaching and learning methods. Oxford Polytechnic.

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Prentice Hall.

Nelson, R. (2013). Practice as research in the arts: Principles, protocols, pedagogies, resistances. Palgrave Macmillan.

Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.

Rubino, M. & Verdolini Abbott, K. (2024) 'Scoping review of voice therapy adherence', *Journal of Voice*, 38(2), pp. 426-434. doi:10.1016/j.jvoice.2021.09.020.

Appendix

Artefact Portfolio: Dual-Phase Training for Occupational Voice Users

Title: *Vocal Resilience Portfolio - Morning Activation and Afternoon Recovery Routines*

Purpose:

This portfolio is designed to support occupational voice users in preventing and managing vocal fatigue. It integrates evidence-based techniques from singing pedagogy and clinical voice therapy, providing short and practical routines that can be embedded into daily life.

General Guidance

- **Duration:** Each routine takes 5 - 10 minutes.
- **Environment:** Exercises can be performed quietly in classrooms, offices, or at home.
- **Equipment:** No equipment is required. A straw (optional) may enhance some tasks.
- **Frequency:** Morning activation before teaching/speaking. Afternoon recovery after heavy use.
- **Hydration:** Maintain hydration throughout the day; steam inhalation is optional for recovery.

Morning Activation Routine (~ 5 minutes)

Goal: Prepare the vocal system for occupational load, increasing efficiency and flexibility.

1. LIP BUBBLE SLIDES - These slides are ascending, to increase the blood flow, wake up the vocalisation, and prepare for the gradually increasing volume and flexibility of the voice for the day.
2. LIP BUBBLE RUNS - The same lip bubble technique applies to the lip bubble runs. Narrowing the voice work down (including all five tones) enhances the forward placement and stretches articulation. The resonance is turned on throughout this exercise.
3. V SLIDES - Connect the voice range from the bottom to the top. A "voice flip" is encouraged to feel the difference between chest and head voice control.

Afternoon Recovery Routine (~ 5 minutes)

Goal: Recalibrate, release tension, and restore vocal function after occupational use.

1. BLOW FISH SLIDES - The first part of the Afternoon Routine Exercises is using descending scales. Blowfish exercises balance the pressure below and above the vocal folds, allowing them to be free throughout. Let the voice drop and slide down.

2. V SLIDES - These V SLIDES are descending. Allowing the voice to settle and slide on the V fricative safely. A balance between the pressures is also maintained.

3. BUBBLE SLIDES - First bubble slides of the afternoon phase are descending. Dropping the voice down helps relax the voice.

4. ASCENDING BUBBLE SLIDES - The second part of the afternoon phase is strengthening. We are using ascending bubble slides and runs. All performed lightly, in medium dynamics, letting the voice function after

vocal load and its release again.

Supportive Hygiene Recommendations

- Hydrate consistently throughout the day.
- Avoid shouting across noisy spaces; move closer instead.
- Use short vocal breaks where possible.
- Steam inhalation may assist recovery, but is supplementary.

Portfolio Features

- **Discreet:** Exercises can be done quietly and quickly.
- **Accessible:** Designed for non-singers and everyday contexts.
- **Evidence-Based:** Draws from clinical therapy (e.g., SOVT, fish blowing) and pedagogy (e.g., incremental sirens, breath focus).
- **Habitual:** Structured as morning and afternoon sessions to build a routine.

Closing Note

This artefact bridges scientific knowledge and practical application, embedding factual and conceptual knowledge into a usable format. It is intended as a preventative tool rather than a treatment resource, promoting resilience and sustainability for occupational voice users when performed daily.