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Module: BMPF 7074D
Independent Study Module (Extended: Artifact Design)
25 October 2024
Total Word Count: 11,271
Component 1 Portfolio :6338
Component 2 Project Report Critical Review: 4933

**Developing Healthy Vocal Habits:
A Modular Approach to Vocal and Physical Warm-Ups for Young Singers**

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Project Portfolio

Methodologies and Insights: Navigating the Development of Vocal Education Tools

Introduction

As a voice teacher with over 15 years of experience, I have worked extensively with young singers to correct vocal flaws and address issues they developed during their participation in youth choirs and musical theater programs. These students were often under the instruction of adults who lacked the knowledge to properly care for young voices. Poor vocal technique, combined with a lack of physical care for the body, can lead to long-term vocal health problems (Verdolini et al., 2014). My personal experience has motivated me to ensure that I am providing effective, evidence-based tools to promote healthy singing practices. Furthermore, as the owner of a music school, I have a responsibility to equip my instructors with the tools to guide their students toward sustainable, healthy vocal habits.

The rationale for this project stems from the necessity to develop more effective vocal warm-ups and exercises for young students. Many teens that I have worked with have developed unhealthy singing habits due to inadequate instruction in choirs and musical theater programs, where vocal training is often treated as secondary to entertainment (Howell, 2017). This project aims to create an artifact that addresses these gaps—a structured vocal and physical warm-up program tailored to children. By focusing on research in vocal pedagogy and child psychology, the proposed artifact will offer educators tools that are both educational and engaging. Integrating best practices from music education will contribute to the field by providing a resource that enhances students' learning experiences (Lehmann et al., 2007).

The artifact I propose to develop will consist of a “mix-and-match” sheet offering a variety of vocal and physical warm-ups that can be customized to different group settings. The flexibility of this resource will allow educators to choose warm-ups that fit their lesson plans and engage their students in selecting exercises, fostering greater student agency in the learning process (Jones, 2015). In addition to this sheet, I will create public YouTube videos demonstrating each warm-up, offering educators a visual reference to ensure the correct and consistent implementation of the exercises (Schrum & Levin, 2015). Visual learning

tools, particularly in the context of physical activities like warm-ups, have been shown to enhance retention and understanding (Mayer, 2014).

Research indicates that voice problems among young singers are often the result of improper technique and insufficient warm-ups (Baker, 2011). Developing voices are particularly vulnerable to strain from improper use (Gish et al., 2012). Studies have demonstrated that structured and appropriate warm-ups are essential for maintaining vocal health, reducing the risk of injury, and improving vocal performance (Titze, 2007). In addition to vocal warm-ups, research has highlighted the importance of incorporating physical movement into vocal preparation (Welch et al., 2020). Physical activities such as posture and breathing exercises can significantly improve vocal performance (Callaghan & Wilson, 2002; Thurman & Welch, 2000). The artifact will take a holistic approach to warm-ups by integrating both vocal and physical components to promote healthier habits in young singers.

Traditional vocal programs and warm-ups often fail to engage young voices effectively, focusing more on entertainment than education. This project seeks to fill that gap by providing a tool that combines structured vocal exercises with physical warm-ups, all grounded in contemporary educational best practices (Caine & Caine, 2011). Student engagement can be significantly enhanced when students are given choices and agency in their learning (Jones, 2015). By allowing students to select their own warm-ups from a curated list, educators can foster greater responsibility for vocal health while maintaining student interest.

This project aims to address a critical need in the education of young singers by offering a flexible, research-backed resource for vocal and physical warm-ups. The proposed artifact, supported by a mix-and-match sheet and a demonstration video, will engage students, promote healthy singing practices, and contribute to the overall goal of improving vocal health in music and theater arts education.

Planned Program of Study

Context and Positionality:

Positionality refers to the social and professional factors that shape a researcher's

perspective, including their background, experiences, and relationships to the subject matter (Holmes, 2020). My positionality as a voice teacher with over 15 years of experience working with young singers is essential to this study. In my teaching career, I have seen numerous instances where young voices have been damaged due to poor vocal instruction in youth choirs and musical theater programs. These settings often fail to provide the specialized care and attention young voices require, leading to long-term vocal health issues. The focus of my professional practice is to rehabilitate these voices, equipping young singers with proper vocal techniques and ensuring their vocal health is protected for the future.

In addition to my role as a teacher, I am also the owner of a music school where I oversee a team of instructors. This dual role as an educator and administrator gives me a unique perspective on how vocal pedagogy is applied in practical settings. It also reinforces my responsibility to provide my instructors with the tools and resources they need to teach healthy vocal techniques. Through this project, I aim to develop an artifact that fills the gaps I have observed in current vocal pedagogy for young students. This artifact will promote long-term vocal health while engaging young learners, ensuring that their vocal development is not only effective but also enjoyable.

Theoretical Influences:

The theoretical foundation of this project is grounded in two critical frameworks: vocal pedagogy and developmental psychology. Vocal pedagogy emphasizes the necessity of structured, systematic exercises to cultivate healthy vocal habits, particularly for developing voices. As McKinney (2005) and recent studies by Hoch and Sandage (2018) assert, young singers require exercises tailored to their specific developmental stages to ensure a strong foundation for healthy vocal production. Without these foundations, young voices are at risk of developing damaging habits that may be difficult to correct later in life. Hoch and Sandage (2018) highlight the importance of motor learning, which involves progressing through cognitive, associative, and autonomous stages as students gradually refine control over vocal muscles, pitch, and resonance. This concept is integral to the design of my artifact, a color-coded card system that uses the colors of the rainbow to sequence warm-up exercises. Each color group represents a progressive stage, starting with breathing

exercises and moving incrementally toward full singing, aligning with motor learning principles by allowing students to build skills in a structured order (Hoch & Sandage, 2018).

The color-coded system also supports deliberate practice by providing focused, sequential exercises that build on each other. As Ericsson, Krampe, and Tesch-Römer (1993) describe, deliberate practice involves structured, goal-oriented tasks with immediate feedback. My card system enables teachers to engage students in picking cards from the color groups in order, creating a balance of guidance and autonomy. This incremental design allows students to experience immediate feedback as they progress through each stage, reinforcing healthy vocal habits and building endurance while giving them a sense of control over their learning process (Ericsson, Krampe & Tesch-Römer, 1993; Hoch & Sandage, 2018).

Additionally, developmental psychology provides insights into how children learn and what motivates them. Piaget's (1952) theory of cognitive development underscores the importance of engaging children in age-appropriate, interactive activities that align with their developmental stages. The design of my artifact incorporates this by allowing students to pick cards, fostering autonomy, and engaging them in decision-making. Supporting this, Welch, Howard, and Nix (2020) and Thurman and Welch (2020) highlight the importance of interactive, age-appropriate warm-ups that not only build vocal technique but also cater to children's cognitive readiness and shorter attention spans. Younger children often have shorter attention spans because their executive functions, such as attention control and self-regulation, are still developing, making age-appropriate, engaging tasks especially critical for maintaining focus (Diamond, 2013; McClelland et al., 2010; Posner & Rothbart, 2007). The exercises and warm-ups have fun names and combine physicality and movement with singing, which helps sustain engagement and keeps young, active bodies involved in the learning process. By integrating these theoretical perspectives, my artifact addresses both the technical and motivational needs of young students, ensuring that it fosters enthusiasm for learning and mastery of vocal skills.

Best Practice Influences:

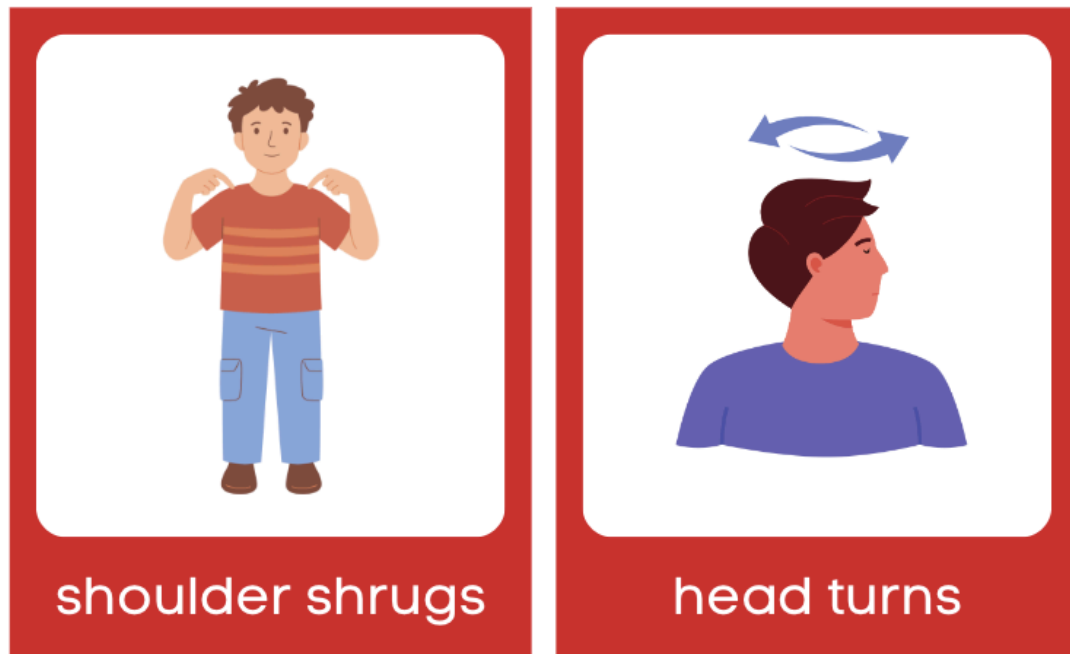
Best practices in music education suggest that successful teaching strategies incorporate playful, interactive elements that engage children and create a positive learning environment. Gordon (2012) notes that using interactive learning activities, such as musical

games and collaborative exercises, enhances children's engagement and retention. Similarly, Welch et al. (2020) emphasize that age-appropriate, structured activities that integrate movement, fun, and interaction not only foster skill development but also sustain attention in young learners. The design of this artifact, a color-coded card system that sequences vocal warm-ups by progressively moving from breathing exercises to phonation and eventually full singing, builds on these principles. Each card group represents a specific color in rainbow order, providing both structure and visual appeal that help students follow a healthy warm-up progression while making the process enjoyable and accessible.

In designing the visual elements of the vocal exercise cards, I utilized high-quality images from Canva (2024), a paid stock image service. This choice was made to enhance visual engagement and clarity, thereby supporting young learners' interaction with the material. Using Canva images also allowed for a cohesive and professional presentation of the exercises, aligning with best practices for educational design in music pedagogy (Mayer, 2014).

Figure 1: Color-Coded Vocal Exercise Cards for Sequential Warm-Ups

Each card represents a distinct warm-up stage, organized by color to support memory and progression for young singers. I designed the cards with images procured from the paid service Canva (2024) for visual engagement.



Pretend you have a feather in front of you. Take a breath and blow gently to make the feather float. Try not to let the feather fall to the ground. This helps with soft, controlled breathing.



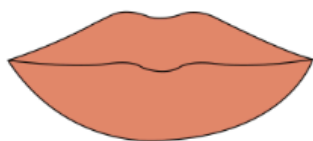
Blow the Feather

Take a deep breath and sigh out with a "haaa" sound, sliding your voice from high to low, like you're going down a playground slide. Feel the breath and sound move together.



Sigh Like a Slide

Gently close your lips and hum, making the "mmm" sound like you're thinking. Feel the vibrations in your lips and face as you hum a tune or hold a note. Keep the front of your tongue touching your bottom teeth and the top of your mouth.



Humming

Pretend you're a buzzing bee! Close your lips and make a "bzzz" sound, like a bee flying. Feel the vibrations in your lips and cheeks as you buzz.



Buzzing Bee

Take a straw, put it in your mouth, and insert into a container of water. Blow bubbles into the water as you sing.



Straw Bubbles

Make a "v" sound like you're saying the letter "V" and hold it for as long as you can. Try making your voice slide up and down while holding the "v" sound.



"V" Sound

Sing "Do-Sol-Do" (1-5-1) and squat slightly when you hit the "Sol" note (the higher note). Try to squat gently and smoothly with the music.



Fifth Squats

Sing "Do-Sol-Do" (1-5-1) and slide your voice up and down between each note. While you're singing, twist your upper body to the right on one slide, and to the left on the next one. Make sure your hips stay still, and your chin stays in line with your chest!



Twist and Sing



Student-centered learning approaches are another critical component of best practice pedagogy. Research indicates that giving students agency in their learning process increases engagement and fosters a sense of ownership over their development (Jones, 2015). The artifact adopts a “mix-and-match” format, enabling students to select their vocal and physical warm-ups from a curated list, empowering them to take an active role in their vocal development. This choice-based approach aligns with the principles of autonomy and self-regulation, both of which are essential for effective learning (McPherson & Gabrielsson, 2020; Zimmerman, 2002). Furthermore, the inclusion of playful, movement-based warm-ups acknowledges children’s natural inclination toward physical activity, which facilitates learning through physical engagement and supports memory retention, as noted by Medina (2014).

Integrating flexibility within a structured framework allows teachers to adapt the warm-up exercises to different classroom needs, ensuring that every student can engage according to their developmental stage and personal interest. The artifact’s format, which involves short, fun exercises with memorable names, not only captures young students' attention but also makes it easier for educators to offer engaging, developmentally suitable vocal training that is rooted in best practices for music education.

Methodological Influences:

The development of the artifact is guided by methodologies drawn from educational research, vocal pedagogy, and cognitive development theory. Research and critical analysis of foundational theories in child-centered pedagogy, including Piaget's stages of cognitive development, have informed the design of the artifact by emphasizing the importance of age-appropriate, engaging activities (Piaget, 1952). This understanding guided the choice of short, fun, movement-based vocal warm-ups tailored to young attention spans, aligning with principles that support the development of focus and engagement in children (Diamond, 2013). Additionally, Zimmerman's (2002) principles of self-regulated learning influenced the "mix-and-match" format of the artifact, which allows children to select exercises and develop autonomy in their learning process. Research by McClelland et al. (2010) also highlights the importance of self-regulation and its link to academic success, further supporting the artifact's flexible, choice-based structure.

Bandura's (1997) social cognitive theory underpins the importance of self-efficacy in learning, suggesting that young learners benefit from tasks they perceive as achievable, which fosters motivation and engagement. This concept influenced the design of accessible, achievable warm-ups that match children's developmental stages, enabling them to experience success at each stage. Bandura's principles are complemented by Vygotsky's (1978) social development theory, which underscores the role of social interaction and scaffolding in learning.

Additionally, Vygotsky's concept of the Zone of Proximal Development (ZPD) is integral to the design, referring to the range of tasks that a learner can complete with guidance but not yet independently. Through carefully tailored scaffolding, teachers can support students within this zone to gradually build independent mastery. After teachers introduce the color-coded cards and demonstrate each exercise, it's conceivable that students could later use the cards on their own at home, following the color order to guide themselves safely through the warm-ups. Supporting this approach, Fisher and Frey (2020) emphasize a gradual release model, where structured support transitions to independence, enhancing self-efficacy by building confidence and ownership in young learners. Pearson and Gallagher's (1983) "I Do, We Do, You Do" framework also aligns with Vygotsky's ZPD, emphasizing a step-by-step transition to independent learning. Moreover, van de Pol,

Volman, and Beishuizen (2019) highlight how personalized scaffolding within the ZPD boosts motivation and skill mastery by meeting students at their current capabilities and guiding them incrementally to greater independence.

A valuable next step involves gathering insights from teachers on student engagement and the ease of implementing the exercises, providing critical data to refine the artifact to better meet educators' and students' needs (Appendix 3 contains a sample questionnaire designed for this purpose). Future feedback collection could also be enhanced by grounded theory approaches (Charmaz, 2006), allowing for iterative adjustments based on educator input and ensuring the artifact remains responsive to user experiences.

Aims & Objectives:

The primary aim of this study is to develop a comprehensive vocal warm-up and exercise program tailored specifically to young students, which is essential given their developing vocal anatomy and susceptibility to strain (Zemlin, 1998). This program, structured through a color-coded card system, fills a gap in current vocal pedagogy by providing educators with an evidence-based tool that promotes healthy vocal practices in children. The card system uses colors to guide students sequentially through warm-ups, beginning with breathing exercises, progressing to phonation, and culminating in full vocalization, ensuring a safe and structured warm-up. Each exercise is designed with age-appropriate names, physical movements, and incremental difficulty to keep students engaged and reinforce healthy vocal habits, addressing common issues arising from improper vocal instruction (Boone et al., 2005).

In line with current research, Hoch and Sandage (2018) emphasize that exercise science principles in vocal warm-ups are crucial for skill acquisition and fatigue resistance in young voices. Similarly, Sparkhall (2023) supports the value of structured warm-ups tailored to children's developmental needs, advocating for approaches that engage children with developmentally suitable, enjoyable activities. This structure aligns well with the artifact's webpage, where educators can view demonstration videos of each exercise, download the card sets, and access foundational information on child anatomy and physiology, helping them understand the mechanics behind each warm-up and apply the activities effectively (Mayer, 2024).

The specific objectives of the project are as follows:

- **To create engaging and educational vocal exercises:** The exercises are designed to capture students' attention while reinforcing key vocal techniques, aligning with best practices in vocal pedagogy that emphasize structured and systematic vocal training (McKinney, 2005). Additionally, drawing on principles from child psychology, the exercises are educational and developmentally appropriate, matching the cognitive and physical capabilities of young students (Piaget, 1952). Research by Welch, Howard, and Nix (2020) supports the need for exercises that consider children's developmental stages, reinforcing the choice to use a color-coded, sequential system that builds incrementally from breathing exercises to full singing. Sparkhall (2023) further emphasizes that child-centered, engaging activities can significantly improve retention and focus for young learners.
- **To develop strategies that maintain student motivation:** Motivating young students is crucial for effective teaching, and recent studies indicate that incorporating opportunities for choice enhances engagement and participation (Jones, 2015; Fisher & Frey, 2020). This artifact supports motivation by including strategies like collaborative learning and allowing students to select exercises from a curated list, fostering autonomy and a sense of ownership over their learning process. Research by McPherson and Gabrielsson (2020) underscores the effectiveness of student-centered learning in music education, where a mix-and-match format aligns well with theories of self-regulation and student engagement.
- **To ensure the exercises are developmentally appropriate and beneficial for vocal health:** Each exercise is carefully crafted to support healthy vocal production, helping prevent strain or injury in line with the latest research in vocal health (Titze, 2000). Young voices are particularly vulnerable due to their pliability and ongoing development, necessitating vocal activities that minimize the risk of injury while enhancing technique (Beckett & Bartlett, 2005). Hoch and Sandage (2018) discuss the importance of incorporating physiological principles in vocal exercises to support safe, effective warm-ups for developing voices, a priority reflected in the artifact's design.

- **To educate vocal teachers, choir leaders, and musical theater program leaders on child anatomy, physiology, and psychology:** One key objective of this project is to equip educators with foundational knowledge in child anatomy, physiology, and psychology to mitigate physical harm and prevent the formation of poor vocal habits. By understanding the unique characteristics and vulnerabilities of young voices, educators can apply exercises safely and effectively (Beckett & Bartlett, 2005; Titze, 2000). The artifact's accompanying webpage provides accessible resources on child vocal fold development and psychological readiness, drawing on research that emphasizes the importance of developmentally suitable activities for young learners (Hoch & Sandage, 2018; Welch, Howard & Nix, 2020). The webpage also includes instructional videos that model each exercise, allowing educators to see these techniques in action and to feel confident in their implementation. By offering these resources, the project supports evidence-based practices in vocal education, ensuring that educators can promote students' vocal health through informed, research-based strategies (Sparkhall, 2023; Fisher & Frey, 2020).

These objectives align with the SMART framework, ensuring that they are Specific, Measurable, Achievable, Relevant, and Time-bound (Doran, 1981). By clearly defining these goals, the project can measure success through both quantitative and qualitative assessments, ensuring that the artifact meets the needs of educators and students (Creswell, 2014).

Ethical Considerations:

Ethical considerations are integral to this project, as it involves reflective professional practice aimed at developing a safe and effective vocal warm-up tool for young students. The design of the artifact is grounded in academic research and theoretical reflection, focusing on minimizing harm and promoting healthy vocal practices for children. Given the pliability and ongoing development of young vocal anatomy, children are particularly susceptible to strain and injury if exercises are not designed appropriately (Beckett & Bartlett, 2005; Titze, 2000). By structuring the artifact's warm-up sequence with age-appropriate, color-coded exercises, the project aims to reduce these risks by fostering gradual skill-building in a safe, evidence-based manner (Hoch & Sandage, 2018; Welch, Howard & Nix, 2020).

An important objective of the project is to equip vocal teachers, choir leaders, and musical theater program directors with foundational knowledge in child anatomy, physiology, and psychology. The artifact's accompanying webpage provides resources on child vocal fold development, psychological readiness, and instructional videos modeling each exercise, helping educators understand the internal mechanics and developmental needs behind each warm-up. This resource promotes informed, evidence-based instruction, ensuring that educators can confidently support their students' vocal health and safety (Sparkhall, 2023; Fisher & Frey, 2020).

As an insider researcher with a personal investment in vocal pedagogy, I recognize the potential for biases in interpreting and reflecting on the artifact's development. To address this, I employed Schön's model of reflective practice, which emphasizes *reflection-in-action* and *reflection-on-action* (Schön, 1986). Through reflection-in-action, I critically assess design choices while actively developing the artifact, allowing me to make real-time adjustments that enhance its usability and effectiveness. Reflection-on-action then enables me to analyze the effectiveness of these choices afterward, evaluating how well they align with research and best practices in vocal pedagogy. This reflective approach helps me to remain objective and continuously improve the artifact without relying on external feedback (Herr & Anderson, 2014).

By centering the project on safe practices, reflective research, and adherence to ethical guidelines, this project aims to develop a vocal warm-up tool that respects the unique anatomical and psychological needs of young students, fostering a healthy and supportive learning environment.

Expected Learning Outcomes:

The expected learning outcomes for this project reflect both my personal professional development and the broader educational impact of the artifact. By completing this project, I aim to achieve the following outcomes:

1. **A deeper understanding of vocal pedagogy for children:** Developing this artifact will deepen my knowledge of the specific needs of young singers and the best practices for promoting healthy vocal habits.

2. **Improved skills in creating educational and engaging vocal exercises:** The process of designing the artifact will enhance my ability to create exercises that are both pedagogically sound and engaging for young learners.
3. **Enhanced knowledge of effective teaching strategies for young students:** Researching and implementing strategies that motivate and engage young students will improve my teaching practices and inform future curriculum development.
4. **Increased ability to assess and refine educational programs based on feedback:** The iterative process of designing and refining the artifact will improve my ability to use feedback to inform program development and ensure that educational tools meet the needs of their users.

These learning outcomes align with the broader goals of the project, ensuring that the artifact is not only an educational tool for young singers but also a valuable resource for my own professional growth.

Activities and Methodologies:

The development of the artifact will involve a series of reflective and research-based activities to ensure its educational effectiveness and practical applicability. Key activities include:

- **Literature Review:** The project will begin with a comprehensive literature review, focusing on vocal pedagogy, child psychology, and best practices in music education. This review will establish the theoretical foundation of the artifact, drawing on recent studies and established texts to ground the project in evidence-based practices. This stage includes examining reflective practices from Schön (1986) and Kolb's Experiential Learning Theory, which provide structured approaches for integrating theory into practice through cycles of learning and reflection (Kolb, 1984).
- **Exercise Design:** Informed by the literature review, initial vocal exercises and warm-ups will be designed with developmental appropriateness as a priority. Each exercise will incorporate elements that allow for student choice, aligning with findings on student-centered learning (McPherson & Gabrielsson, 2020). To foster engagement, exercises will include age-appropriate names, which research shows can enhance children's connection to the material (Gordon, 2012; Sparkhall, 2023).

- **Reflective Refinement of Exercises:** Using Schön's (1986) concept of *reflection-in-action* and *reflection-on-action*, the exercises will be refined through cycles of reflection and adjustment, assessing their alignment with pedagogical goals and safety for young voices. Kolb's (1984) model of critical reflection will further guide the process, encouraging an examination of assumptions and biases in each design choice. This reflective approach ensures that the exercises remain developmentally appropriate, effective, and aligned with the project's objectives.
- **Personal Evaluation and Iteration:** The final stage involves a reflective evaluation of the artifact's design and potential application in educational settings. Through self-guided reflections on the artifact's usability, effectiveness, and engagement potential, the project will undergo iterative refinements to ensure it aligns with the needs of educators and students alike. This process draws on Gibbs' Reflective Cycle (Gibbs, 1988), providing a structured framework for evaluating and refining the artifact based on insights gained through academic research and reflective practice rather than direct data collection from classrooms.

This reflective, research-centered approach ensures that the artifact is designed, developed, and refined with a strong theoretical foundation and a focus on the practical needs of educators and young students.

Timescales and Review Dates:

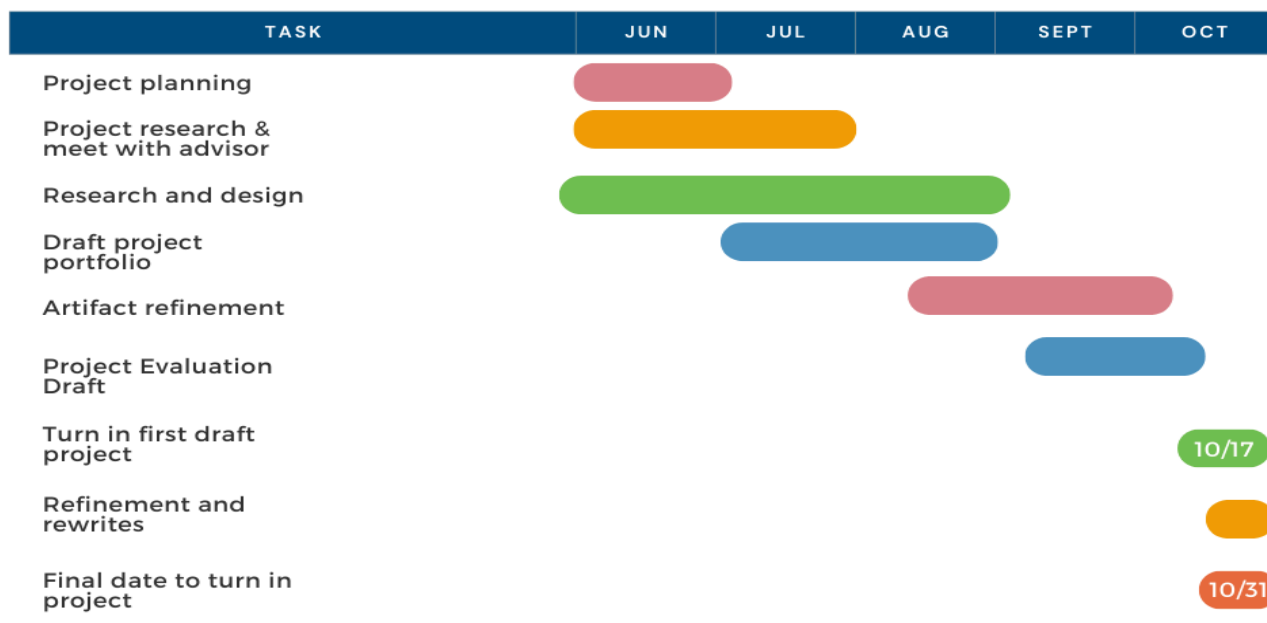
The project will be carried out over a period of six months, with key milestones as follows:

- June-July: Conduct a comprehensive literature review, focusing on vocal pedagogy, child psychology, and educational best practices. Begin designing the initial set of vocal exercises informed by these findings.
- July-August: Develop the first version of the exercises, ensuring alignment with best practices in vocal health, child development, and music education.
- September-October: Refine the exercises through reflective practice, using academic frameworks such as Schön's reflection-in-action and reflection-on-action (Schön, 1986) and Gibbs' Reflective Cycle (Gibbs, 1988). This stage involves adjusting and enhancing the exercises based on insights gained from the literature and self-reflective analysis.

- October: Conduct a final evaluation of the project, reviewing the artifact's design and objectives through a structured reflective process. Assess its alignment with the project's aims, ensuring that it is effective, user-friendly, and theoretically sound.
- October: Submit the first draft and then the final draft of the entire project.

Figure 2: The following Gantt chart provides a clear visual representation of the project's timeline and key milestones outlined above.

MODULE 5 PROJECT PROGRESS - GANTT CHART



A Gantt chart is a visual project management tool that displays tasks or activities over time, illustrating the start and end dates of each task in a project (Wilson, 2003). It is represented as a horizontal bar chart, where each bar corresponds to a task, and its length represents the duration of the task. Gantt charts are useful because they provide a clear and concise way to visualize the sequence of activities, helping project managers and teams track progress, identify potential bottlenecks, and ensure that tasks are completed on time (Lock, 2007). By displaying overlapping tasks, it also highlights the interdependencies between activities, making it easier to manage resources and timelines efficiently (Maylor, 2010).

Methodology:

Rationale for Chosen Review Methodology:

The chosen review methodology for this project is a systematic literature review combined with qualitative analysis. A systematic review allows for a comprehensive and unbiased

synthesis of existing research, providing a solid foundation for developing evidence-based vocal exercises tailored for young students (Kitchenham & Charters, 2007). Incorporating qualitative analysis allows for deeper insights into the practical applications and real-world experiences of vocal teachers, ensuring that the final artifact is both theoretically sound and practically relevant (Silverman, 2016).

Evidence of Process and Inclusion/Exclusion Criteria:

The review process began with a targeted search of academic databases such as PubMed, JSTOR, and Google Scholar, applying terms that included “child psychology and anatomy,” “development of child vocal folds and larynx,” “child development and engagement,” “best practices for child learning and retention,” “studies on child attention span,” “safe vocal exercises for children,” and “presenting educational material online.” These searches helped focus on core areas in vocal pedagogy, child development, and educational strategies in music. For the online component of the artifact, search terms like “best practices for online video presentation” and “formatting information for educational materials” were also used to inform the digital presentation of the resource.

Inclusion criteria centered on peer-reviewed journal articles, books, and conference papers published within the last 20 years to ensure relevance and currency (Creswell, 2014). Studies that specifically addressed vocal training for children, child-focused educational engagement strategies, and developmental psychology were prioritized. Exclusion criteria included studies not related to vocal education, those with outdated methodologies, and non-peer-reviewed sources, unless they offered substantial insights from experienced practitioners (Gough, Oliver & Thomas, 2017).

Resourcing Relevant and Credible Material:

To ensure the credibility of the material, sources were selected based on their publication in reputable journals and by recognized academic publishers. For example, articles from journals such as *Journal of Voice* and books published by Oxford University Press were included due to their established authority in the field of vocal pedagogy and music education (Lehmann, Sloboda & Woody, 2007). Additionally, practitioner literature was sourced from respected industry publications and reports to balance academic rigor with practical relevance (Howell, 2017).

Need for Particular Sources:

The need for a diverse range of sources stems from the multifaceted nature of the project, which intersects vocal pedagogy, child psychology, and educational methodologies. White literature, including peer-reviewed journal articles and academic books, provides a robust theoretical foundation and evidence-based practices essential for the project's credibility (McKinney, 2005). Gray literature, such as industry reports, educational guides, and practitioner insights, offers real-world perspectives and practical examples that enhance the applicability of the research findings (Adams et al., 2017). Practitioner literature from experienced vocal teachers also provides contextual insights that academic research might overlook, ensuring the final artifact is not only theoretically sound but also practically useful (Hylton, 2006).

Balancing White and Gray Literature:

Balancing the use of white and gray literature is crucial to provide a comprehensive understanding of the topic. White literature offers scientifically validated data and theoretical frameworks that underpin the project's academic integrity (Gordon, 2012). Gray literature, on the other hand, often captures contemporary trends, practitioner experiences, and emerging best practices that may not yet be reflected in academic publications (Thomas & Harden, 2008). By carefully selecting and integrating both types of literature, the project benefits from a holistic view that combines rigorous scientific evidence with practical insights (Howell, 2017).

Situating Practitioner Literature:

Practitioner literature was included to ensure that the artifact developed is directly applicable and beneficial to voice teachers in real-world settings. This literature was chosen based on the authors' expertise, their contributions to the field, and the relevance of their insights to the project's goals (Merriam, 2009). Contributions from experienced voice teachers and music educators provide practical strategies and firsthand accounts of effective teaching practices, essential for creating a useful and impactful artifact (Gordon, 2012). This approach ensures that the project is grounded in academic theory while enriched by practical, actionable insights from the field (Adams et al., 2017).

Critical Review: Kolb's Experiential Learning Theory

The following critical reflection on my project is guided by Kolb's Experiential Learning Theory (Kolb, 1984), which provides a structured framework for understanding the learning process through four cyclical stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. This model is particularly applicable to my development of a vocal warm-up and exercise program tailored to young students, as each phase facilitates a deeper understanding of both the pedagogical and practical considerations involved. By systematically moving through each stage, I have been able to synthesize insights from hands-on teaching experience, theoretical frameworks in child development and vocal pedagogy, and current research on engagement and learning strategies in music education (McKinney, 2005; Gordon, 2012).

Concrete Experience

In Kolb's Experiential Learning Theory, the "Concrete Experience" stage is where the learner actively engages in a specific task or situation, creating a firsthand basis for observation and later reflection (Kolb, 1984). This initial phase emphasizes direct, practical involvement, which Kolb suggests is crucial for developing a meaningful connection to the material and for fostering deeper understanding in later stages (Healey & Jenkins, 2000; Kolb & Kolb, 2005). Through direct interaction with the task, learners build foundational knowledge that they can draw upon throughout the reflective process.

With over 15 years of experience as a voice teacher, I have worked with a wide range of singers of all ages, gaining deep insight into their vocal, emotional, and mental challenges. This practical experience, and my personal research solving these problems, has provided me with a good understanding of vocal pedagogy, enriched by firsthand knowledge of the complexities that young singers face both in technique and personal development. This concrete experience has been central to the development of my current project, where the goal is to create a vocal warm-up and exercise program specifically tailored to children. According to McKinney (2005), structured vocal exercises are crucial for developing healthy vocal habits, particularly in young voices. This aligns with my experiences, as I have consistently observed the detrimental effects of inadequate instruction on children's vocal health. However, as I began to plan my artifact, I recognized the need to reinterpret my experience in light of more contemporary pedagogical theories. While I had always relied on

traditional methods of vocal instruction, like structured scales, repetition-based warm-ups, and breathing exercises focused primarily on technical control, my preliminary research has highlighted new approaches that incorporate developmental psychology and engagement-focused learning strategies (Gordon, 2012).

This preparatory learning has been essential for reshaping my understanding of vocal pedagogy and its application in young learners. Developmental psychology, particularly Piaget's (1952) theory of cognitive development, has introduced me to the importance of age-appropriate exercises that align with children's cognitive stages. Reflecting on this, I realize that while my concrete experience as an educator is invaluable, it must be adapted to incorporate these contemporary insights, making my future teaching practices more aligned with current educational standards.

Reflective Observation

In Kolb's Experiential Learning Cycle, "Reflective Observation" is the stage where learners examine and reflect upon their experiences, identifying key insights, patterns, or discrepancies between their actions and the theoretical frameworks guiding their practice (Kolb, 1984; Schön, 1986). This reflective process is crucial for transforming practical experience into meaningful learning, as it encourages individuals to critically evaluate and question their assumptions and methods (Gibbs, 1988). Reflective observation allows for a deeper understanding of both strengths and areas for improvement, fostering an adaptable approach to professional practice.

In reflecting on my preparatory learning, I have identified several inconsistencies between the explored theory and my prior understanding. One key discrepancy lies in how student engagement is facilitated. Traditionally, my approach focused heavily on vocal technique without giving enough attention to student motivation and engagement strategies. However, research by Jones (2015) emphasizes that allowing students to make choices in their learning process can significantly improve their engagement and commitment. This contrasts with my earlier practices, where I largely dictated the structure of lessons without offering students the autonomy to shape their learning experience.

Additionally, I initially believed that vocal exercises should be highly structured and rigid to ensure discipline and technique. However, my exploration of best practices in music

education, such as those discussed by Hylton (2006), reveals that incorporating interactive and playful elements into vocal exercises is not only effective but necessary for young learners. This reflective observation has helped me recognize that my experience, while valuable, must be more flexible and adaptable to modern pedagogical approaches.

This reflective insight has shifted my approach to vocal pedagogy, emphasizing the importance of balancing structured vocal technique with student-centered engagement strategies. By integrating choice and interactivity into lessons, I can create a learning environment that not only focuses on vocal discipline but also fosters a sense of autonomy and enthusiasm in young students. Research shows that when students have a role in shaping their learning, it strengthens their intrinsic motivation and commitment to their practice (Jones, 2015; McPherson & Gabrielsson, 2020). This shift aligns with Hylton's (2006) perspective that incorporating playful elements in vocal exercises is essential for young learners, supporting both engagement and technical skill development.

Therefore, I am now developing my artifact with these principles in mind, blending structured vocal exercises with engaging, choice-driven activities. This new approach not only reflects a deeper understanding of educational psychology but also ensures that my teaching methods are adaptable, evidence-based, and conducive to both vocal growth and learner motivation. Through this process, I aim to create a flexible, student-centered vocal program that bridges theory with practical application, fostering a balanced and effective learning environment for young singers.

Abstract Conceptualization

In Kolb's Experiential Learning Theory, "Abstract Conceptualization" is the stage where learners process reflections and observations into deeper theoretical insights, enabling them to construct or reframe knowledge with a more comprehensive perspective (Kolb, 1984). This process involves synthesizing new ideas from theoretical research and personal experience, which then inform future planning and strategies (Schön, 1986). This stage is crucial for developing the adaptability to refine educational tools continually, blending concrete insights with broader academic frameworks to support evidence-based innovation in teaching (Boud et al., 1985).

Through this reflective process, several insights have emerged, leading me to reframe my approach to vocal exercises for young students. I now recognize that effective vocal training must balance technical rigor with engagement and flexibility. Research by Gordon (2012) emphasizes the value of an interactive learning environment that encourages active participation—an approach I now view as essential for keeping students motivated while promoting long-term vocal development.

Theoretical perspectives from developmental psychology, specifically Piaget's stages of cognitive development, have also enhanced my understanding of age-appropriate learning. According to Piaget (1952), children's cognitive processing evolves with age, impacting how they engage with vocal exercises. This has prompted me to reconsider my lesson structures, especially for younger students whose cognitive capacities differ significantly from those of older learners. Moving forward, I intend to design vocal exercises that address both technical skills and children's cognitive and emotional needs, balancing rigorous skill-building with developmental appropriateness (Dumont & Syurina, 2017).

My research methodology for this process focused on a balanced review of white literature—peer-reviewed journal articles and academic books in vocal pedagogy and music education (Lehmann et al., 2007)—and gray literature, such as industry insights, to capture a full range of theoretical and applied perspectives (Adams et al., 2017). This methodological strategy aims to ensure the artifact is both academically grounded and practically relevant for educators.

Targeted search terms such as "vocal pedagogy," "child development in music education," and "vocal health for children" will be used to gather relevant literature (Howell, 2017). Incorporating diverse sources will allow me to build a comprehensive theoretical foundation that enhances the artifact's real-world applicability and relevance for teaching practices (Hammersley, 2008).

Once this project is complete, further refinement of the artifact could be achieved by engaging in structured experimentation with educators and students to assess and optimize its usability, engagement, and educational impact. Such an action plan aligns with Creswell's (2014) endorsement of a mixed-methods research approach, which captures a comprehensive view of educational tools' effectiveness. Future pilot testing and surveys,

using the teacher feedback questionnaire outlined in Appendix 3, would provide meaningful data to evaluate the exercises in practical settings, allowing iterative adjustments based on real-world applicability.

Ultimately, this stage of active experimentation and ongoing refinement would help to shape the final artifact into a versatile, impactful tool for vocal pedagogy, benefiting both students and educators. This iterative process of reflection and adaptation aligns with Schön's (1983) reflective practice model and Kolb's (1984) framework, supporting an adaptable and research-informed approach that will continue to evolve with each new cycle of learning and application.

Conclusion: Tools for Educators to Support Healthy Vocal Development in Young Singers

This project addresses a need in vocal pedagogy by developing a comprehensive warm-up and exercise program tailored specifically for young voices. By grounding the artifact in theoretical frameworks of vocal pedagogy and developmental psychology, as well as best practices in music education, the study provides an engaging, evidence-based tool that could help educators promote vocal health in young singers. Through a structured color-coded card system and accessible online resources, the artifact allows educators to guide students through progressive, developmentally appropriate warm-ups while fostering autonomy and engagement.

Using a systematic literature review and reflective methodologies, this project ensures that the artifact remains theoretically sound and practically relevant. Instead of relying on external feedback, the artifact's design and refinement have been informed by cycles of reflective practice (Schön, 1986), supported by theoretical insights and best practices. The project's alignment with SMART objectives, its attention to ethical considerations, and its methodical development approach further underscore its commitment to providing an effective, sustainable resource for voice teachers and educators (Doran, 1981).

Ultimately, this artifact supports the healthy development of young voices and contributes to the field of vocal education by creating a flexible, research-backed tool that enhances both teaching and learning experiences. By offering a resource that prioritizes student engagement, cognitive development, and physical safety, this project could serve as a

valuable addition to educational tools for vocal instructors dedicated to fostering lifelong vocal health.

Project Report

Critical Review: Insights Gained Through the Learning Process

Introduction:

During childhood, the vocal folds are shorter and thinner, resulting in a higher-pitched voice. As children age, the vocal folds lengthen, and the larynx descends, contributing to a deeper pitch, particularly noticeable during puberty (Kent & Vorperian, 2011). In boys, the vocal folds undergo substantial growth due to hormonal changes, leading to a significantly lower voice (Zemlin, 1998). By age 18, the vocal anatomy reaches maturity, with males typically having longer, thicker vocal folds than females, contributing to gendered voice differences (Hirano et al., 1983).

Understanding these anatomical changes is vital because children's voices remain more susceptible to strain and injury. The pliability of their vocal folds makes them prone to fatigue if subjected to excessive use or improper technique (Boone et al., 2005). Many instructors in choirs and musical theater programs encourage practices such as shouting or singing at volumes or weights inappropriate for their age, which can lead to vocal trauma, especially if proper breath support is not taught (Titze, 2000). Instructors sometimes demand that children sing in vocal ranges that are too high or too low, which forces strain on the developing vocal folds (Zemlin, 1998). Additionally, during extended rehearsals, children's voices may be overused without sufficient breaks, further risking fatigue and potential long-term damage (Beckett & Bartlett, 2005).

Studies reveal that smiling while singing, often encouraged to improve tone or projection, results in poor aerodynamics, causing unnecessary tension in the vocal tract (Scherer & Guo, 1990). This technique forces the lips into a horizontal position, which narrows the vocal tract and increases pressure on the vocal folds, leading to oversinging and fatigue (Scherer & Guo, 1990). In my professional experience I have observed many teachers instruct their students to smile while they sing or smile to hit higher pitches. In my observations and foray into the literature it seems that many children are instructed to simply "sing louder" without

learning proper breath support or resonance techniques, which leads them to press their vocal folds together too tightly, increasing the risk of injury (Baker et al., 2023; Patel et al., 2018). If unchecked, these practices lead to the development of vocal nodules, swelling, or even vocal fold trauma, as excessive vocal fold adduction (closure) reduces the efficiency of phonation (Rosen & Murry, 2000).

To mitigate these issues, modern vocal pedagogy emphasizes the use of semi-occluded vocal tract exercises, such as lip trills or straw phonation, which help balance subglottal pressure and improve vocal fold closure without excessive strain (Titze & Verdolini Abbott, 2012). These techniques reduce the pressure on the vocal folds, allowing for smoother oscillation and lowering the risk of vocal fold injury. Proper breath support plays an essential role in this process, as it distributes the necessary pressure across the entire vocal apparatus rather than concentrating it on the vocal folds (Colton et al., 2011).

In my own teaching practice, I frequently encounter students who develop poor vocal habits due to these common yet damaging techniques. I work with these students to correct the amount of pressure they apply to their vocal folds, focusing on balancing their airflow and vocal fold closure to reduce the risk of injury. Drawing on these insights from new and prior research, I developed a warm-up and exercise program tailored to children's needs, addressing both the physiological and acoustic aspects of healthy vocal production. By understanding the developmental stages of the vocal folds and promoting exercises that improve airflow and vocal efficiency, my project fills a gap in vocal pedagogy, providing instructors with tools to guide students toward long-term vocal health.

In addition to addressing the physiological and developmental needs of young voices, the design of this artifact includes a web-based resource to enhance instructors' accessibility to the exercises. The webpage features instructional videos and downloadable resources that allow teachers to see each exercise in action, fostering confidence and understanding in proper technique (Mayer, 2014). Visual demonstrations are essential in teaching complex vocal techniques because they help bridge the gap between written instructions and physical practice, offering educators a model for how to effectively guide students through each exercise (McPherson & Gabrielsson, 2002).

Using Mayer's (2001) principles of multimedia learning, the videos on the webpage incorporate visual and auditory elements to engage dual channels in the brain, enhancing comprehension and retention. For example, each video is designed with signaling cues—visual indicators such as arrows or text overlays—to highlight key areas, such as the positioning of the lips or airflow management. Research shows that such multimedia elements increase clarity and support the learner's ability to understand and apply these techniques in real-world settings (Mayer & Moreno, 2003).

The structure of the webpage also aligns with Sweller's (1988) cognitive load theory by segmenting content into concise, manageable segments. This approach reduces cognitive overload by allowing instructors to focus on one skill at a time, such as breath support or vocal tract alignment, before moving on to more complex combinations. The downloadable rainbow color-coded cards further support this structure, giving instructors the flexibility to select exercises based on the students' age and level, encouraging sequential learning and gradual skill development (Sullivan, 2020).

Including downloadable resources such as printable exercise cards promotes interactive and self-paced learning. Instructors can use these cards directly in their classrooms or practice spaces, integrating hands-on activities that align with Bruner's constructivist theory, which suggests that learning is most effective when learners actively participate (Bruner, 1966). By fostering a multi-modal learning environment with visuals, hands-on tools, and guided exercises, this artifact's web-based resource offers a comprehensive platform for instructors to improve their teaching practice and ensure safe, sustainable vocal development for their students.

Review: Evaluating Artifact Design Through the "Know How, Know That, Know What" Lens

In this section, I will employ the reflective framework of "Know How, Know That, Know What," as outlined in *Nelson's Research as Practice in the Arts and Beyond* (Nelson, 2013), to critically assess the development of my artifact. This model is particularly effective for analyzing the intersection between theoretical knowledge, practical skills, and factual understanding in creative projects. The "Know That" component emphasizes the theoretical and conceptual frameworks that underpin the artifact's design, guiding how knowledge and

research have shaped its structure (Nelson, 2013). "Know How" explores the procedural knowledge and skills applied during the artifact's creation, examining how my hands-on experience and practical techniques informed its development (Nelson, 2013). Finally, "Know What" critically examines the factual and contextual knowledge embedded in the artifact, reflecting on how well it meets its intended objectives and aligns with best practices.

Using this model allows for a thorough evaluation of both the practical and intellectual processes behind the artifact, ensuring a balance between theory and application. It also provides a structured approach to reflection, helping to identify areas of strength and potential improvement by considering not only *what* was done but also *why* and *how* these decisions were informed by broader research (Nelson, 2013). This method ensures that each aspect of the artifact is grounded in evidence and critical reasoning, offering a comprehensive reflection on its development and potential impact.

By breaking down the reflection into these three categories, the model encourages deeper critical thinking about how different types of knowledge contribute to the creation process, making it a useful framework for both creative and research-driven projects (Nelson, 2013).

Know That: Theoretical Principles, Frameworks, and Best Practices

In designing this artifact, the guiding aim was to create a structured, research-informed approach to vocal education that aligns with the developmental needs of young singers. The "Know That" framework, as conceptualized by Nelson (2013), allows for a critical examination of the theoretical principles, conceptual frameworks, and best practices foundational to the artifact's design. Drawing on key insights from vocal pedagogy, developmental psychology, and music education, this section explores how evidence-based approaches informed each element of the artifact.

Vocal pedagogy literature, such as McKinney's (2005) work on healthy vocal habits, emphasizes that youth vocal education should focus on physiological care and sustainable technique development. Recent studies have shown that tailored, structured exercises are essential for guiding young voices safely, as they differ anatomically and physiologically from adult voices (Bigler & Osborne, 2021; Welch, 2022). Additionally, developmental psychology—particularly Jean Piaget's (1952) theory of cognitive stages—has provided valuable insight into crafting exercises that are both age-appropriate and cognitively

accessible. By understanding these frameworks, the artifact aligns with best practices in vocal health and supports gradual skill progression in a way that suits children's unique learning stages (Dumont & Syurina, 2017; Hargreaves & Lamont, 2017).

This section will analyze how these theoretical insights have been integrated into the artifact's design, demonstrating a commitment to evidence-based approaches that not only foster vocal health but also promote developmental and cognitive engagement. Through evaluating these theoretical underpinnings, the "Know That" component reveals the deeper intentions behind the artifact's creation and its alignment with the principles of child-centered, sustainable vocal education (Nelson, 2013) .

A key theoretical influence in the design of the artifact is developmental psychology, particularly Jean Piaget's (1952) theory of cognitive development, which underscores that children process information and learn at different stages. Understanding these stages is essential in designing age-appropriate, cognitively accessible exercises. For example, Piaget's theory suggests that young children in the preoperational stage (ages 2-7) are best suited to learning through concrete, playful activities rather than abstract instructions. Hargreaves and Lamont (2017) build on Piaget's ideas, emphasizing that cognitive engagement in music education must consider children's developmental stages, particularly in designing exercises that connect with their immediate, playful interests. This understanding has informed the inclusion of interactive and enjoyable vocal exercises in the artifact, engaging students in ways that align with their cognitive stages.

As students move into the concrete operational stage (ages 7-11), they develop the ability to think more logically and handle structured learning (Piaget, 1952), allowing the artifact to gradually introduce technical aspects of vocal training, such as breath control and resonance. Studies show that cognitive development in this age range benefits significantly from structured, progressively challenging activities that build upon earlier skills, providing a framework that aligns well with systematic vocal exercises (Frischen et al., 2022; Dumont & Syurina, 2017).

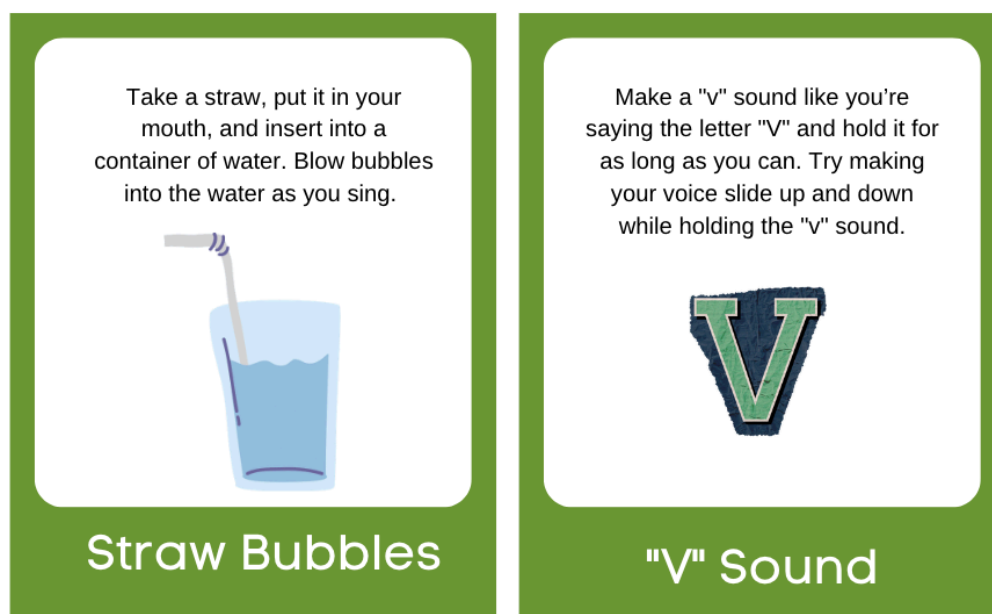
Research also underscores the importance of interactive, developmentally appropriate learning strategies for fostering engagement and skill acquisition in children. For instance, music activities have been shown to enhance cognitive functions like attention, working

memory, and executive functioning—skills foundational to learning new tasks and integral to vocal training (Dumont & Syurina, 2017; Hargreaves & Lamont, 2017). Additionally, rhythm processing studies highlight that music education tailored to cognitive stages can support broader learning, building prediction abilities and cognitive-motor processing (Frischen et al., 2022). These findings support the artifact's design, where children are engaged in concrete, enjoyable activities during the early stages of learning, enhancing their ability to retain and apply foundational vocal techniques.

Best practice guidelines in music education further influence the artifact's design. Research by Hylton (2006) and Gordon (2012) emphasizes the importance of creating interactive and playful learning environments for children, as such approaches improve engagement and learning retention. Building on these concepts, Welch (2022) and McPherson and Gabrielsson (2020) argue that children's musical development flourishes when they are given the autonomy to make choices within their learning process. This aligns with Jones' (2015) findings that student choice, such as selecting vocal exercises or repertoire, enhances engagement and helps students take ownership of their learning. These concepts are embedded in the artifact's design, where students can choose exercises or contribute to repertoire decisions, fostering autonomy and deeper engagement in vocal learning.

Vocal health research also significantly guides the artifact's development, emphasizing the risks of vocal overuse or misuse in children due to their still-maturing vocal folds. Studies by Titze (2000) and Verdolini et al. (1998) highlight that improper technique can lead to strain, making structured exercises critical to protect young voices. Recently, Bigler and Osborne (2021) reiterated that children's vocal folds require careful conditioning to avoid injury, underscoring the value of developmentally appropriate warm-ups. Semi-occluded vocal tract (SOVT) exercises, such as lip trills and straw phonation, are effective techniques for minimizing strain while promoting efficient vocal function, aligning with these best practices (Titze & Verdolini Abbott, 2012).

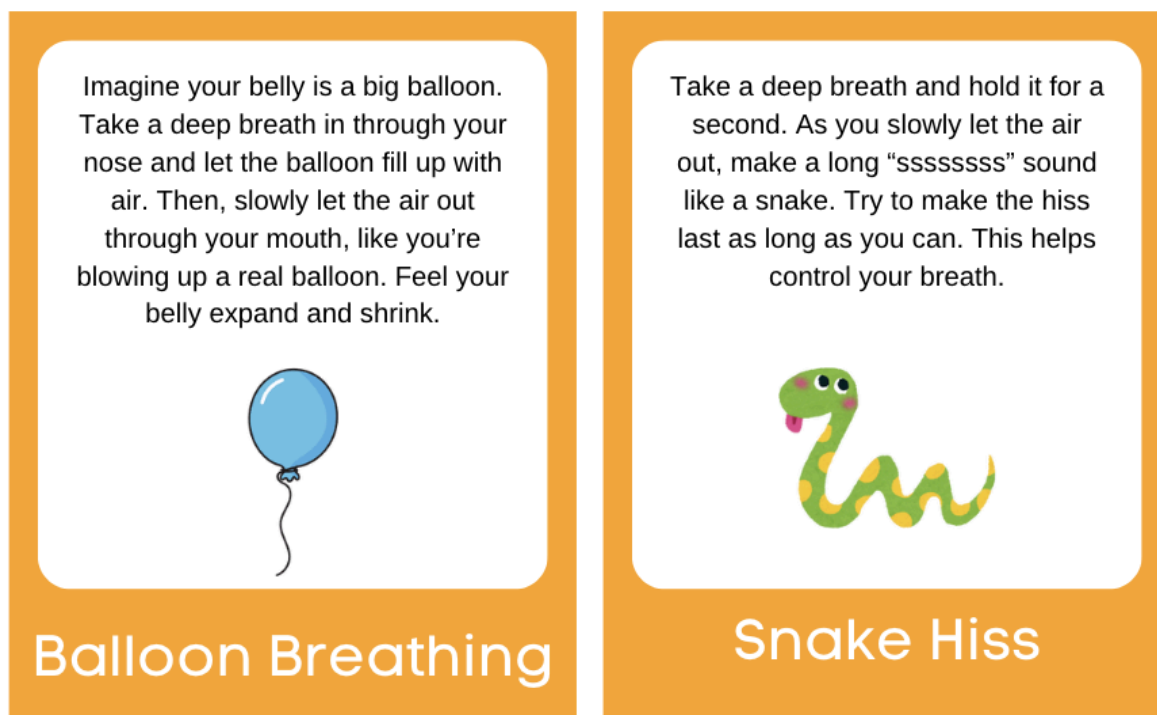
Figure 3: Showcases two of the green cards from the deck that I designed, each featuring Semi-Occluded Vocal Tract (SOVT) exercises.



In

In addition, the theoretical framework for this project includes the importance of breath support and resonance in vocal technique. Boone et al. (2005) emphasize the role of diaphragmatic breathing in preventing strain by ensuring that sound is not forced through the vocal folds. More recent literature, such as McPherson and Gabrielsson (2020), supports these principles, confirming that exercises focused on breath support and resonance are essential in promoting healthy vocal habits in young singers.

Figure 4: Displays two of the orange cards from the custom-designed deck, featuring exercises centered on breath and body support to enhance vocal resonance.



The creation of this artifact is deeply informed by research and established theoretical principles in vocal pedagogy, developmental psychology, and music education. Each component is designed to promote vocal health, engagement, and educational development, ensuring that young learners benefit from an evidence-based and enjoyable learning experience. This integration of theory and best practice provides educators with a valuable tool to foster healthy and sustainable vocal habits while maintaining student interest and motivation.

Know How: Practical Application and Development of the Artifact

The "Know How" section focuses on the procedural knowledge and practical skills applied in the creation of this artifact. In this context, "Know How" examines how experiential and embodied knowledge—gained through hands-on experience, critical reflection, and practical application—have informed each stage of development (Nelson, 2013). This section explores the specific teaching techniques, iterative decision-making, and embodied

knowledge that shaped the artifact, critically analyzing how these elements combine to support the goals of sustainable vocal health and engagement for young singers.

The development of this artifact is deeply rooted in my hands-on experience as a voice instructor, combined with knowledge gained through research during my Module 4 and 5 projects. My Module 4 research project focused on the anatomy and physiology of the vocal folds, examining the specific effects of warm-ups and cool-downs on vocal fold function and health. The creation process was shaped by critical, practical insights into the vocal challenges young singers face and a focused application of research on the anatomy, physiology, and psychology of vocal health. In my years of working with young students, I frequently encountered issues of vocal strain, breath management, and inefficient vocal habits that stem from improper technique, especially in musical theater settings where vocal projection is emphasized over technique (Boone et al., 2005). This experience directly influenced the structure of the artifact, guiding me to incorporate exercises that prioritize breath support, resonance, and sustainable vocal practices to reduce strain on young voices.

A fundamental aspect of this artifact is the rainbow-colored card system, designed to facilitate a structured, engaging learning process for young students. Drawing from developmental psychology and pedagogy, I chose a color-coded system for its familiarity and appeal to children, fostering ease of use and engagement (Frischen, Degé, & Schwarzer, 2022). The card colors are sequenced progressively to build skills in an accessible format, starting with foundational breathing exercises and moving toward more complex tasks like phonation and vocalization. This choice was informed by research on structured learning approaches, which show that visually organized learning tools aid procedural learning and cognitive retention in young students (Dumont & Syurina, 2017).

Figure 5:

Complete Sequence Displaying the Rainbow Colors of the Mix-and-Match Cards

To create a reliable and sustainable foundation for vocal health, I integrated semi-occluded vocal tract (SOVT) exercises, such as lip trills and straw phonation, into the artifact. SOVT exercises are recognized for reducing phonation threshold pressure and encouraging balanced vocal fold closure, which is particularly beneficial for developing voices (Titze & Verdolini Abbott, 2012). As an instructor, I have found SOVT exercises invaluable in addressing the common issue of excessive vocal fold adduction, which often leads to fatigue or even trauma. By incorporating these exercises, the artifact provides young singers with techniques that emphasize airflow and resonance over volume, promoting

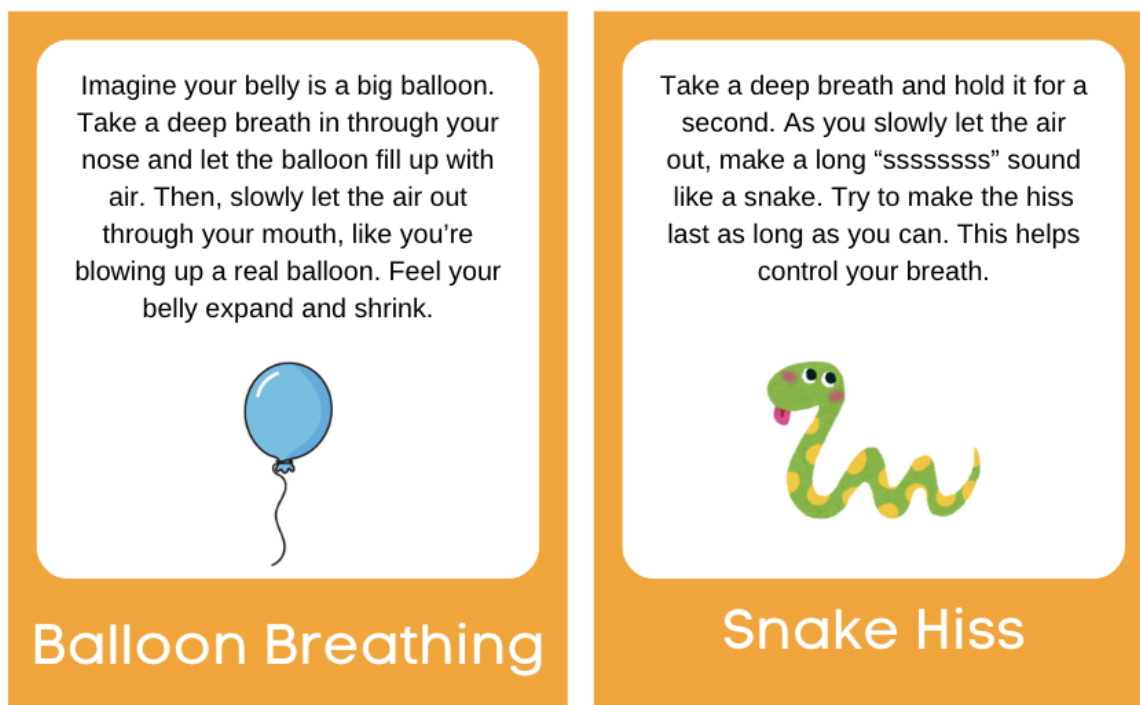
healthy, strain-free vocalization (Bigler & Osborne, 2021). My Module 4 research, which highlighted the benefits of warm-ups that increase blood flow and reduce strain on vocal tissues, further solidified the decision to integrate SOVT exercises as a foundation for each warm-up routine (Titze, 2000).

Figure 6:

Green cards with instructions for some of the Semi Occluded Vocal Tract exercises.



The design of the artifact also reflects my understanding of modular learning. Modular tools provide flexibility, allowing educators to adapt lessons to meet specific student needs (Bruner, 1966). The structure of the artifact is built upon the principles of scaffolding, where exercises become progressively complex, ensuring that each skill builds upon the last. This approach aligns with Wood, Bruner, and Ross's (1976) scaffolding theory, which advocates for guiding learners through complex skills by incrementally introducing new elements. The rainbow card system, for instance, begins with basic breath control exercises that teach children how to engage their respiratory system effectively before moving to resonance exercises, ensuring a logical, supportive skill progression.

Figure 7:**Sample Cards from the Breath Management Section of the Deck**

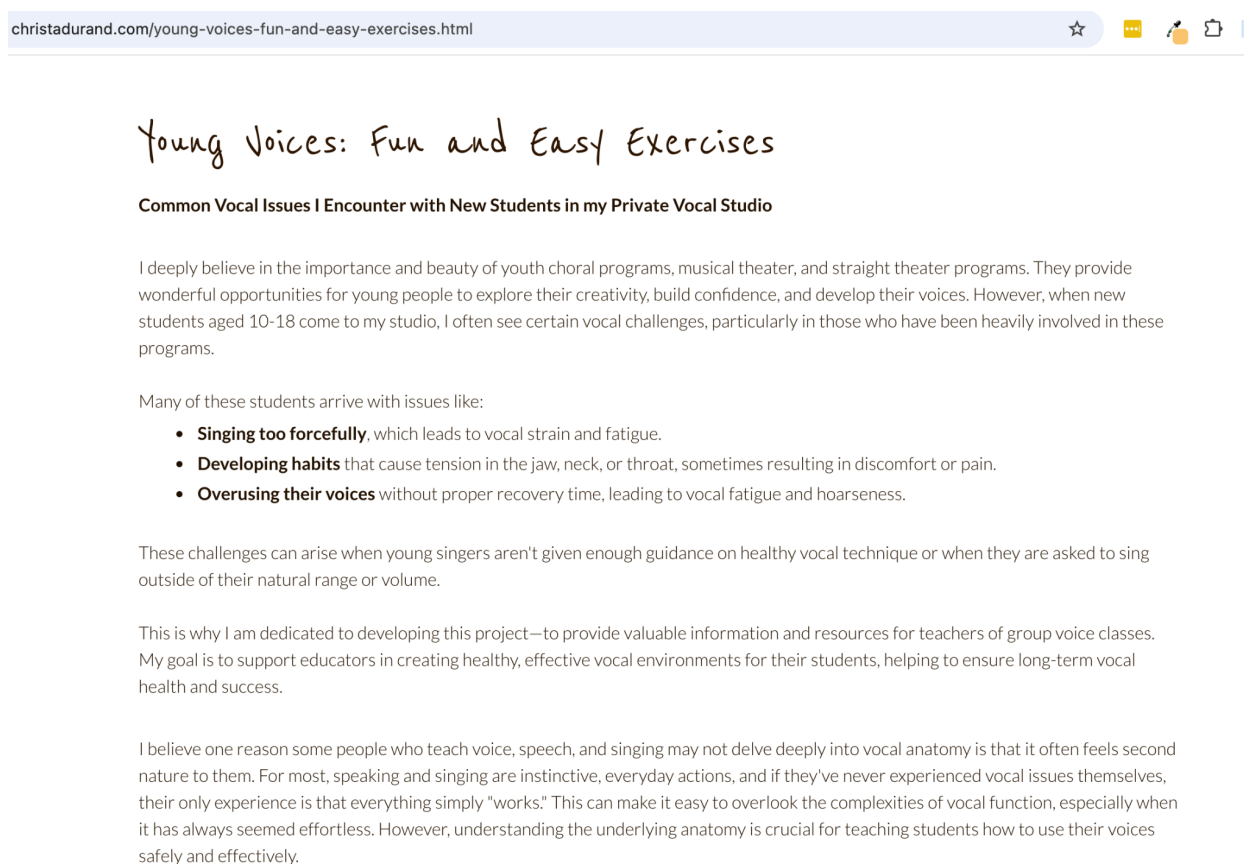
To manage cognitive load effectively, I designed each exercise module to focus on a single skill, like breath control, resonance, or articulation, and incorporated these skills progressively. Following Sweller's Cognitive Load Theory (1988), dividing learning into distinct sections prevents information overload, ensuring that children can retain and apply each skill before moving on to the next. This approach reduces cognitive strain, supporting both retention and performance.

Furthermore, I designed the artifact to include an online component that offers video demonstrations and downloadable resources. This decision was driven by my experience as a teacher, knowing that educators often benefit from visual demonstrations when learning new exercises and methods. Mayer's Multimedia Learning Theory (2001) supports the effectiveness of combining visual and auditory elements in educational materials, which

enhances understanding and retention. Through the webpage, instructors can see each exercise performed and explained, allowing them to gain confidence and understanding in the techniques before implementing them with their students (McPherson & Gabrielsson, 2020). Each video is purposefully concise and focused, aligned with Sweller's (1988) principle to avoid cognitive overload by keeping content short and relevant.

Figure 8:

Screenshot of the beginning of the resources webpage.



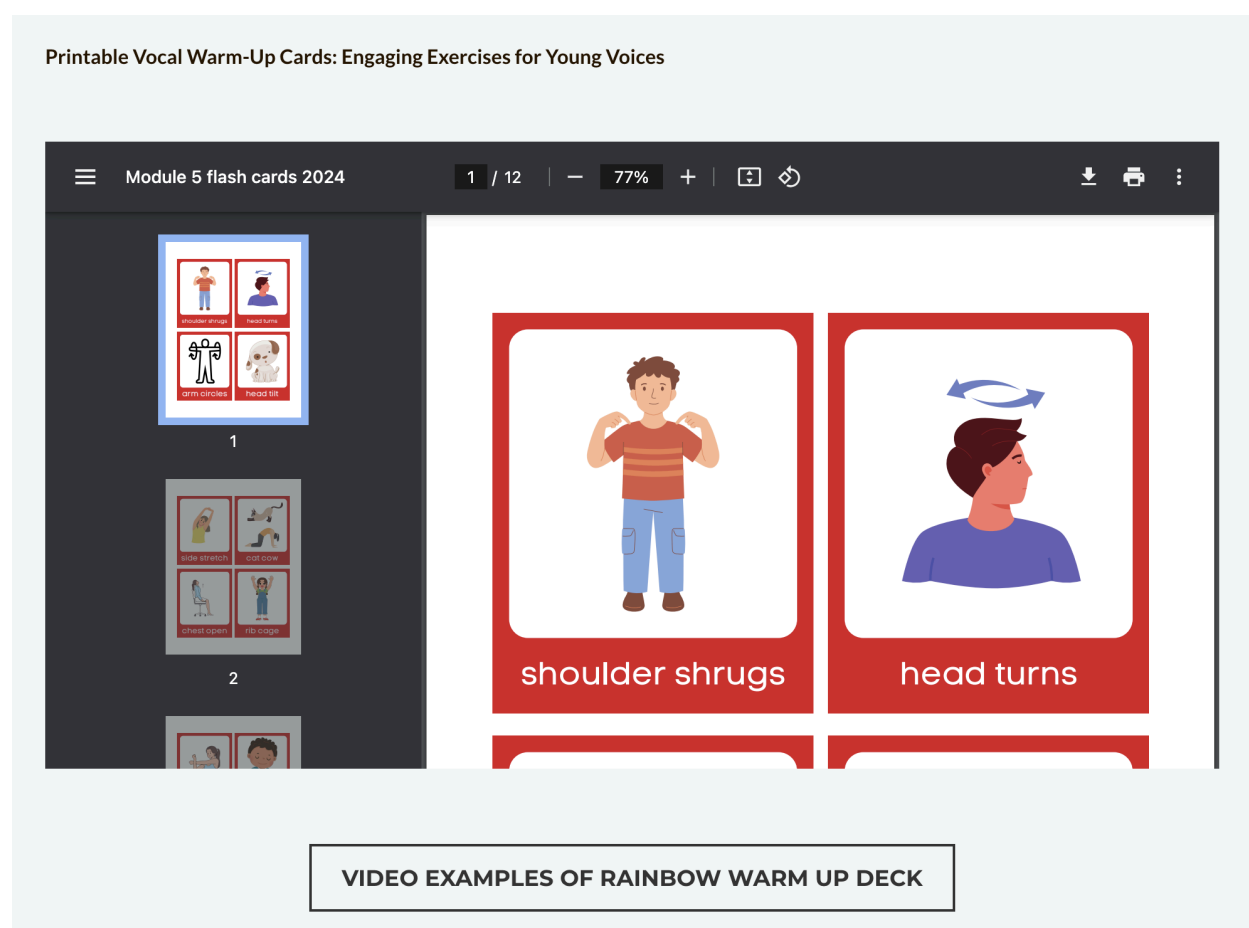
The web component also incorporates elements for self-paced learning, enabling instructors to revisit exercises or pause videos as they need. This feature promotes reflective and adaptive learning, where teachers can revisit sections based on the specific needs of their students (Knowles, 1984). Providing a self-directed, flexible resource empowers educators

to learn and apply techniques at their own pace, which is particularly valuable in settings where preparation time is limited.

Figure 9:

Screenshot of downloadable PDF flashcards

and link button to video demonstrations for each exercise



To enhance engagement and promote active participation, I have incorporated interactive features like choice-based learning, allowing students to select their exercises from the rainbow sequence. This flexibility aligns with Jones' (2015) findings on the importance of student autonomy for motivation, engagement, and ownership in learning. Allowing children

to make choices within their vocal exercises fosters a sense of agency and investment in their practice. These choices support not only vocal development but also the personal growth of young singers by nurturing confidence and responsibility in their learning process.

Each component of the artifact, from the color-coded cards to the webpage resources, was designed with specific learning objectives that follow the SMART criteria—specific, measurable, achievable, relevant, and time-bound (Doran, 1981). For instance, each card focuses on a single goal, such as improving breath control or resonance awareness, allowing educators to track progress and set clear expectations with their students. This structured, goal-oriented approach aligns with best practices in modular learning design, ensuring that each session meets specific learning outcomes.

In designing this artifact, reflective practice played a central role. Using Nelson's (2013) "Know How, Know That, Know What" framework, I continually assessed each component, ensuring that it aligned with both theoretical knowledge and practical application. This reflective approach helped me balance the insights from vocal pedagogy with developmental psychology, ensuring that the artifact meets the unique physiological and cognitive needs of young singers. Schön's (1983) reflective practice principles further supported this process by encouraging critical self-assessment and ongoing improvement, essential for adapting teaching techniques to better serve students. Reflective practice also informed the iterative feedback and evaluation cycle for the web page, ensuring that each element of the resource remains user-friendly and educationally valuable.

By creating this artifact with a foundation in practical experience, reflective insights, and research-based techniques, I aimed to develop a resource that offers instructors a structured yet adaptable approach to nurturing vocal health in young students. Through practical applications, such as modular tools, SOVT exercises, scaffolding, and multimedia resources, the artifact addresses the specific challenges young singers face, providing a comprehensive and accessible tool that empowers both educators and students in the journey toward sustainable vocal development.

Know What: Factual and Conceptual Knowledge

The "Know What" section analyzes the foundational factual and conceptual knowledge that underpins the artifact, focusing on vocal anatomy, cognitive development, vocal pedagogy,

and educational design. This evidence-based foundation shapes each component of the artifact, aligning with best practices to support the physiological and developmental needs of young singers (Nelson, 2013). These principles ensure that the artifact is a comprehensive tool that meets the physical, cognitive, and motivational requirements of young vocal students.

Figure 10:
Screenshot of Web Page Section on Children's Anatomical Development

Here's a quick summary of how young voices develop:

- **Early Development:** At birth, the larynx (voice box) is positioned high in the neck, allowing infants to breathe and swallow at the same time. As children grow, the larynx lowers, and the vocal folds lengthen, resulting in a deeper voice, especially during puberty (Beckett & Bartlett, 2005; Kent & Vorperian, 2011).
- **Voice Changes During Puberty:** Boys, in particular, experience significant growth in their vocal folds due to hormonal changes, which contributes to a much lower pitch. By approximately age 18, vocal anatomy is fully developed (Zemlin, 1998; Hirano et al., 1983).

The size and length of a child's vocal folds significantly influence both their pitch range and vocal quality:

- At birth, the vocal folds are relatively short and thin, which results in a higher pitch range compared to adults (Beckett & Bartlett, 2005).
- As children grow, their vocal folds gradually lengthen and thicken, contributing to a lower fundamental frequency and a deeper pitch (Kent & Vorperian, 2011).
- This change in pitch is particularly pronounced during puberty, especially in boys, due to the influence of hormonal changes that accelerate the growth of the vocal folds (Hirano et al., 1983).
- The shorter and thinner vocal folds in younger children also contribute to a lighter, breathier vocal quality, which becomes richer and fuller as the folds mature and increase in mass (Zemlin, 1998).
- The anatomical development of the vocal folds is a key determinant of both the pitch range and the overall timbre of the child's voice.

It is important to note that the development of the vocal folds and the resulting pitch range and vocal quality may vary for children who are transitioning gender or undergoing hormone therapy. Hormonal treatments, particularly testosterone, can significantly influence the length and thickness of the vocal folds, leading to changes in vocal pitch and timbre (Davies, Papp, & Antoni, 2015). ***As with all children, individual experiences of vocal development can differ, and educators should approach each student's vocal journey with sensitivity and awareness of their unique physiological and emotional needs.***

A core element of the artifact's design is an understanding of the anatomical differences between young and adult vocal folds. Children's vocal folds are shorter and thinner, making them more pliable and therefore more vulnerable to strain if overused (Zemlin, 1998). This underscores the importance of gentle, supportive exercises to prevent potential harm. To address these needs, the artifact integrates semi-occluded vocal tract (SOVT) exercises like lip trills and straw phonation, both of which reduce phonation threshold pressure (PTP) (Titze & Verdolini Abbott, 2012). SOVT exercises have been shown to balance subglottal

pressure effectively, minimizing strain on the vocal folds and encouraging healthy oscillation—an especially crucial benefit for young singers (Bourgeois et al., 2021).

The artifact also utilizes a rainbow-colored card system to guide students through different stages of learning, with each color representing a new level of vocal development, from foundational breathing techniques to phonation and full vocalization. This color-coded sequence enhances memory and promotes an organized approach to skill-building (Sullivan, 2020; Kutopia Collection, 2020). This approach is grounded in research that highlights structured, incremental learning sequences as essential for safely preparing the vocal folds for singing (Titze, 2021). By progressively advancing through these stages, students can build their skills in a controlled, methodical way. For instance, exercises focused on resonance and breath support are key in developing a strong yet strain-free voice, aligning with findings by Titze (2000) and Boone et al. (2005), who emphasize that resonance allows for greater projection without the need for excessive force. Resonance training helps students develop sustainable singing habits and avoid vocal strain, which can otherwise lead to issues like nodules (Rosen & Murry, 2000).

The artifact is further influenced by developmental psychology, specifically Piaget's theory of cognitive stages, which guides age-appropriate learning strategies. For younger children in the preoperational stage, exercises are designed to be playful and tactile, helping make abstract vocal techniques more accessible (Piaget, 1952; Dumont & Syurina, 2017). For older children, who are typically in the concrete operational stage, exercises become more structured, incorporating breath control and gradual advancements in vocal technique that align with their cognitive abilities (Hargreaves & Lamont, 2017; Frischen, Degé & Schwarzer, 2022). This differentiation is essential, as it ensures that each exercise aligns with the students' developmental stages, supporting both cognitive engagement and vocal health.

In addition to cognitive considerations, the artifact also incorporates physical movement to support psychomotor skills, which are vital for singing. Movement-based exercises have been shown to improve vocal technique by engaging core muscles, enhancing breath control, and promoting body awareness, all of which contribute to healthier vocal production (Callaghan et al., 2004; Ruddy & Sapienza, 2004). Movement, such as gentle stretching, also aids posture and reduces physical tension, which can positively impact vocal

performance by creating an optimal posture for singing (Welch, 2006; Spahn et al., 2010). These exercises emphasize kinesthetic learning, allowing students to experience physical sensations that aid in understanding vocal technique.

To help educators implement the artifact effectively, a web page complements the physical materials by offering multimedia resources, including video demonstrations and downloadable guides. The website structure aligns with Mayer's (2009) Multimedia Learning Theory, which supports the integration of text, audio, and visual aids to enhance comprehension and retention. Video demonstrations provide instructors with a clear visual of each exercise, reinforcing correct technique and supporting their understanding of the exercises' physiological benefits (Mayer, 2014; McPherson & Gabrielsson, 2020). The combination of written instructions with video allows for dual-channel processing, where information is simultaneously presented in audio-visual and text formats, improving cognitive retention (Sweller, 1988).

The webpage design is modular, allowing instructors to easily select resources that suit their specific lesson goals. This modularity supports cognitive load management by dividing content into manageable sections, a principle outlined in Sweller's Cognitive Load Theory (Sweller, Ayres & Kalyuga, 2011). The design prioritizes usability and engagement, with clear headings, bullet points, and concise paragraphs, which research indicates are effective for enhancing information retention on digital platforms (Nielsen, 2006). Additionally, the webpage includes downloadable cards that match the color-coded sequences, allowing teachers and students to follow the rainbow progression offline, enhancing continuity between online and in-person instruction.

Another essential feature of the webpage is the interactive aspect, allowing students to engage actively with the material through downloadable resources. Providing active learning options, such as self-assessment or learner-chosen activities, encourages deeper cognitive engagement and allows students to take ownership of their learning (Bonwell & Eison, 1991). The ability to choose exercises from the rainbow sequence fosters student autonomy, which is integral to motivation and consistent practice (Jones, 2015; Gordon, 2012). By supporting self-paced learning, the webpage also accommodates various skill levels and learning speeds, catering to each student's unique developmental path (Knowles, 1984).

The artifact also emphasizes vocal health through structured warm-up routines, which are crucial in gradually preparing the vocal folds for singing. These routines increase blood flow to the vocal folds, enhancing their flexibility and lowering the risk of injury, as advocated by Titze (2000) and Verdolini et al. (1998). Incorporating vocal health information alongside practical exercises equips students with a lifelong awareness of their vocal wellness, teaching them how to protect and sustain their voices (Boone et al., 2005; Welham et al., 2020). The warm-ups are designed to be both educational and engaging, incorporating exercises that not only prepare the voice but also instill a mindful approach to singing—a critical aspect for sustained vocal health.

Reflective practice is another fundamental aspect of the artifact's conceptual design. Using Nelson's (2013) reflective framework, this artifact is continuously assessed and refined through critical self-assessment, ensuring its relevance and efficacy. This ongoing reflection aligns with Schön's (1983) reflective practice model, which promotes iterative evaluation to enhance teaching methods and adapt resources to meet students' evolving needs (Boud, Keogh & Walker, 1985). By integrating reflective practice into the artifact's development, it remains responsive to both pedagogical advances and practical needs in vocal health and student engagement.

In sum, the "Know What" section showcases the factual and conceptual knowledge embedded in the artifact's design, from vocal anatomy to cognitive development and pedagogical strategies. Each component—be it the structured exercises, the color-coded progression, or the supportive online resources—is informed by research and designed to optimize student learning and vocal health. The artifact provides a comprehensive educational tool that aligns with best practices in vocal pedagogy and developmental psychology, supporting instructors and fostering sustainable, health-centered learning for young singers.

Conclusion

In reflecting on the process of developing this artifact, I recognize the importance of research and practical experience in shaping a comprehensive educational tool for young singers. By synthesizing insights from recent studies in vocal pedagogy, music education, and child vocal health, this artifact fulfills the primary aim of providing a structured, engaging

warm-up and exercise program that prioritizes sustainable vocal practices for developing voices (Hoch & Sandage, 2018; Welch et al., 2020).

The online component provides foundational information on vocal anatomy, physiology, and child psychology, allowing educators to make informed choices about exercises. This resource includes demonstration videos and downloadable materials that align with recent studies underscoring the effectiveness of digital tools in enhancing comprehension and application in educational settings (Mayer, 2020; McPherson & Gabrielsson, 2020). The color-coded system, a central feature of the Modular Learning Tool, aligns with findings that visually sequential structures support memory retention and facilitate engagement, particularly in young learners (Dumont & Syurina, 2017; Sullivan, 2020). Through this system, educators can guide students progressively through warm-up stages, from breathing to phonation, allowing for safe vocalization in line with best practices (Titze, 2021).

The inclusion of student-centered design elements, such as exercise choice within a structured framework, addresses another objective: maintaining student motivation and engagement. Studies affirm that providing young learners with autonomy through options in learning activities increases their commitment and enjoyment, reinforcing retention and encouraging self-regulation (Jones, 2015; Fisher & Frey, 2020). By aligning the tool with these insights, the artifact reflects my learning objective of creating exercises that foster both educational engagement and vocal development, supporting young students' vocal and cognitive growth (Frischen, Degé & Schwarzer, 2022; McPherson & Gabrielsson, 2020).

Looking forward, next steps for this project could include inviting educators to implement the artifact and provide feedback on usability and student engagement. This step will inform further refinements and confirm its effectiveness in real-world applications, ensuring it remains responsive to the needs of both teachers and students (Creswell, 2014). Additionally, exploring digital expansions—such as interactive modules or expanded video content—may increase the artifact's accessibility and scalability, aligning with recent findings on the benefits of digital learning tools for music education (Schrum & Levin, 2021).

The development of this artifact meets its objectives by combining hands-on experience with rigorous research, offering a structured, adaptable resource that promotes vocal health and sustained engagement in young singers. Through reflective practice, I have created an artifact that effectively bridges theoretical knowledge with practical application, equipping educators to instill foundational vocal techniques and healthy habits that will serve students throughout their lives.

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Appendix 1

Artifact Part One: Vocal Educator's Guide: Web-Based Learning and Exercise Downloads

The first part of my artifact is a web page designed for vocal educators, offering a comprehensive introduction to the physiology and physics of singing through written

instruction and instructional videos. Educators can also download vocal exercise cards from this page, providing them with ready-to-use materials to enhance student engagement and vocal training.

<https://www.christadurand.com/young-voices-fun-and-easy-exercises.html>

Appendix 2

Customizable Vocal Warm-Up Cards: A Modular Approach for Teachers

The second component of my artifact is a Modular Learning Tool, consisting of printable cards that teachers can laminate for repeated use. These cards are organized into different types of warm ups by the rainbow. Depending on the amount of time you have or your group, you could just choose one or more cards from each color of the rainbow.

Red, Orange, Yellow, Green, Blue, Purple

This system allows students to actively participate by selecting their own exercises, fostering a sense of engagement and autonomy in their vocal practice. By encouraging students to take ownership of their learning process, this tool promotes both self-guided exploration and structured learning.

Red Cards: Body Stretches

1. Head Tilt

Gently tilt your head to one side, bringing your ear towards your shoulder. Hold for a few seconds, then switch to the other side. This helps stretch your neck.

2. Head Turns

Keep your chin level and turn your head to one side and then the other.

3. Shoulder Shrugs

Lift your shoulders up to your ears like you're saying, "I don't know!" Then let them drop back down. Repeat a few times to loosen your shoulders.

4. Arm Circles

Hold your arms out to the side and make big circles with them, first forwards, then backwards. This stretches your shoulders and arms.

5. Side Stretch

Reach one arm over your head and stretch to the side, like you're reaching for the sky. Hold for a few seconds, then switch sides. This stretches your ribs and sides.

6. Back Hug

Give yourself a big hug by wrapping your arms around your chest and reaching for your back. Then gently pull your shoulders forward to stretch your upper back.

7. Chest Opener

Clasp your hands behind your back and lift them gently while pulling your shoulders back. This opens up your chest and stretches your shoulders.

8. Rib Cage Stretch

Stand tall and take a deep breath in. As you breathe out, stretch both arms up and lean back slightly to open your rib cage. This helps you feel the space in your chest and lungs.

9. Cat-Cow Stretch

Seated or standing, put your hands on your knees, Arch your back like a scared cat (Cat Pose), then drop your belly and lift your head (Cow Pose).

10. Arm Stretch

Reach one arm across your body, and with the other hand, gently pull your elbow to stretch your upper arm and shoulder. Hold for a few seconds, then switch sides.

Orange Cards: Breath Work

1. Balloon Breathing

Imagine your belly is a big balloon. Take a deep breath in through your nose and let the balloon fill up with air. Then, slowly let the air out through your mouth, like you're blowing up a real balloon. Feel your belly expand and shrink.

2. Snake Hiss

Take a deep breath and hold it for a second. As you slowly let the air out, make a long "ssssssss" sound like a snake. Try to make the hiss last as long as you can. This helps control your breath.

3. Flower Smell and Candle Blow

Pretend you're smelling a flower—breathe in deeply through your nose. Now, blow out a pretend candle with a slow, steady breath through your mouth. Repeat a few times to feel the air moving in and out.

4. Pretend to Sip Through a Straw

Pretend you're sipping air through a straw, taking in a long, slow breath through your mouth. Then let the air out with a gentle "hmmm" sound, feeling your breath flow smoothly.

5. Pant Like a Puppy

Pretend you're a puppy on a hot day. Take short, quick breaths in and out, feeling your belly move fast. This helps build awareness of how fast and slow breaths feel different.

6. Counting Out Loud

Take a deep breath and count out loud as high as you can with one breath. Try to get to 10 or even higher! This helps practice controlling how much air you use when you speak or sing.

7. Blow the Feather

Pretend you have a feather in front of you. Take a breath and blow gently to make the feather float. Try not to let the feather fall to the ground. This helps with soft, controlled breathing.

8. Sigh Like a Slide

Take a deep breath and sigh out with a “haaa” sound, sliding your voice from high to low, like you’re going down a playground slide. Feel the breath and sound move together.

Yellow Cards: Occluded Vocal Exercises

1. Humming

Gently close your lips and hum, making the “mmm” sound like you’re thinking. Feel the vibrations in your lips and face as you hum a tune or hold a note. Keep the front of your tongue touching your bottom teeth and the top of your mouth.

2. Nasal Humming

Hum a melody or simple scale while keeping your lips closed, but focus on letting the sound come out through your nose. Feel the buzz in your nose as you hum.

3. "Mmm-Yum"

Close your lips like you’re getting ready to say “yum.” Hum “mmm” and then open into a “yum” sound. Repeat this, going back and forth between “mmm” and “yum.”

4. Buzzing Bee

Pretend you’re a buzzing bee! Close your lips and make a “bzzz” sound, like a bee flying. Feel the vibrations in your lips and cheeks as you buzz.

5. Humming Sirens

Hum with your lips closed while sliding your voice from a low note to a high note, like an ambulance siren. Try going up and down smoothly while humming.

6. Nasal "Ng" Sound

Make the “ng” sound like at the end of the word "sing" by keeping your tongue pressed up on the roof of your mouth and closing your lips. Hold the “ng” sound, and feel it in your nose.

Green Cards: Semi-Occluded Vocal Exercises

1. Lip Trills (Blowing Raspberries)

Press your lips together gently and blow air through them, making a "brrrr" sound like you're blowing raspberries. Try doing this while sliding your voice up and down like a siren.

2. Straw Phonation

Take a straw, put it in your mouth, and hum through it while making a sound. Try singing a simple tune or a scale while humming through the straw. You'll feel the air and sound flowing gently.

3. Straw Bubbles

Take a straw, put it in your mouth, and insert into a container of water. Blow bubbles into the water as you sing.

4. "V" Sound

Make a "v" sound like you're saying the letter "V" and hold it for as long as you can. Try making your voice slide up and down while holding the "v" sound.

5. "Z" Sound

Buzz like a bee with a long “zzzzz” sound. Hold the "z" sound and feel the buzz in your mouth and lips. Try singing different notes while making the "z" sound.

6. Cup Your Mouth

Cup your hands around your mouth and hum. This traps some air in your mouth and helps you feel the vibrations of your voice. Try humming a song or simple scale.

Blue Cards: Movement-Integrated Vocal Scales

1. "High Note Squats"

Sing a 5-note major or minor scale, and when you reach the highest note, do a small squat. You don't need to go down very far—just a little bend in the knees!

2. "Thirds Squats"

Sing "Do-Mi-Do" (1-3-1 on the scale) and do a small squat when you reach the higher note, "Mi."

3. "Fifth Squats"

Sing "Do-Sol-Do" (1-5-1) and squat slightly when you hit the "Sol" note (the higher note). Try to squat gently and smoothly with the music.

4. "Twist and Sing"

Sing "Do-Sol-Do" (1-5-1) and slide your voice up and down between each note. While you're singing, twist your upper body to the right on one slide, and to the left on the next one. Make sure your hips stay still, and your chin stays in line with your chest!

5. "Lunging Notes"

Sing a 5-note major or minor scale. As you reach the highest note, step forward into a lunge. Alternate legs, and step back to your starting position after you sing each scale.

Purple Cards: Open Vocal Tract Exercises and mouth shape

1. "Wee Slide"

Sing your scale using the sound "weeee," and make the "W" sound super big! Pretend you're going down a big slide. The exaggerated "W" helps stretch your lips and mouth for better singing.

2. "Fish Lips Sing"

Make fish lips by gently squeezing the sides of your mouth together, like a funny fish face! Keep those lips tight and sing any exercise you like while holding your fish lips. It helps stretch and relax your mouth.

3. "Fat Tongue Tune"

Relax your tongue and let it rest against your bottom front teeth while it feels wide and full inside your mouth, almost touching the roof of your mouth. Sing a lower-pitched scale of your choice, but keep your tongue in this fat position the whole time.

4. "Ghost Woos"

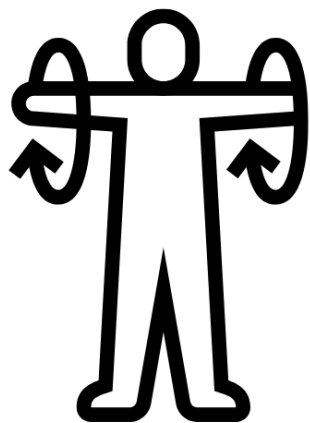
Make a gentle fish face by squeezing your mouth a little bit and sing a scale using "wo wo woo woo woo" for each note, as if you're a friendly ghost! Make sure the "W" sound is clear on every single note.



shoulder shrugs



head turns



arm circles



head tilt



side stretch



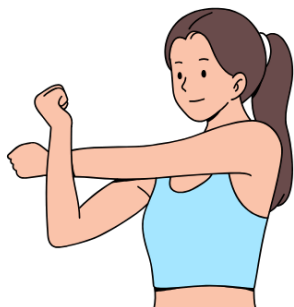
cat cow



chest open



rib cage



arm stretch



back hug



Monkey Squat



Twister

Pretend you have a feather in front of you. Take a breath and blow gently to make the feather float. Try not to let the feather fall to the ground. This helps with soft, controlled breathing.



Blow the Feather

Take a deep breath and sigh out with a “haaa” sound, sliding your voice from high to low, like you’re going down a playground slide. Feel the breath and sound move together.



Sigh Like a Slide

Pretend you’re a puppy on a hot day. Take short, quick breaths in and out, feeling your belly move fast. This helps build awareness of how fast and slow breaths feel different.



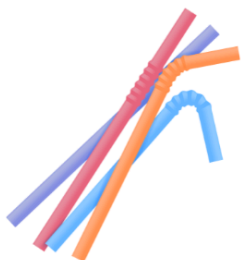
Pant Like a Puppy

Take a deep breath and count out loud as high as you can with one breath. Try to get to 10 or even higher! This helps practice controlling how much air you use when you speak or sing.



Counting Out Loud

Pretend you're sipping air through a straw, taking in a long, slow breath through your mouth. Then let the air out with a gentle "hmmm" sound, feeling your breath flow smoothly.



Sip Through a Straw

Pretend you're smelling a flower—breathe in deeply through your nose. Now, blow out a pretend candle with a slow, steady breath through your mouth. Repeat a few times to feel the air moving in and out.



Flower Smell and Candle Blow

Imagine your belly is a big balloon. Take a deep breath in through your nose and let the balloon fill up with air. Then, slowly let the air out through your mouth, like you're blowing up a real balloon. Feel your belly expand and shrink.



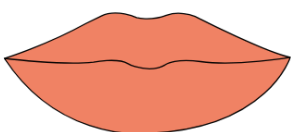
Balloon Breathing

Take a deep breath and hold it for a second. As you slowly let the air out, make a long "ssssssss" sound like a snake. Try to make the hiss last as long as you can. This helps control your breath.



Snake Hiss

Gently close your lips and hum, making the “mmm” sound like you’re thinking. Feel the vibrations in your lips and face as you hum a tune or hold a note. Keep the front of your tongue touching your bottom teeth and the top of your mouth.



Humming

Pretend you’re a buzzing bee! Close your lips and make a “bzzz” sound, like a bee flying. Feel the vibrations in your lips and cheeks as you buzz.



Buzzing Bee

Close your lips like you’re getting ready to say “yum.” Hum “mmm” and then open into a “yum” sound. Repeat this, going back and forth between “mmm” and “yum.”



Mmm-Yum

Hum a melody or simple scale while keeping your lips closed, but focus on letting the sound come out through your nose. Feel the buzz in your nose as you hum.



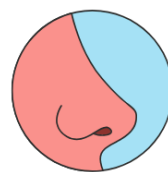
Nasal Humming

Hum with your lips closed while sliding your voice from a low note to a high note, like an ambulance siren. Try going up and down smoothly while humming.



Humming Sirens

Make the "ng" sound like at the end of the word "sing" by keeping your tongue pressed up on the roof of your mouth and closing your lips. Hold the "ng" sound, and feel it in your nose.



Nasal "Ng" Sound

Press your lips together gently and blow air through them, making a "brrrr" sound like you're blowing raspberries. Try doing this while sliding your voice up and down like a siren.



Lip Trills (Blowing Raspberries)

Take a straw, put it in your mouth, and hum through it while making a sound. Try singing a simple tune or a scale while humming through the straw. You'll feel the air and sound flowing gently.



Straw Phonation

Take a straw, put it in your mouth, and insert into a container of water. Blow bubbles into the water as you sing.



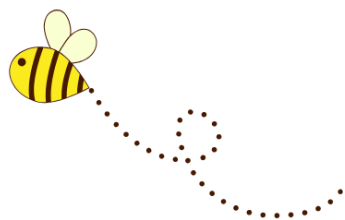
Straw Bubbles

Make a "v" sound like you're saying the letter "V" and hold it for as long as you can. Try making your voice slide up and down while holding the "v" sound.



"V" Sound

Buzz like a bee with a long “zzzzz” sound. Hold the “z” sound and feel the buzz in your mouth and lips. Try singing different notes while making the “z” sound.



"Z" Sound

Cup your hands around your mouth and hum. This traps some air in your mouth and helps you feel the vibrations of your voice. Try humming a song or simple scale.



Cup Your Mouth

Sing a 5-note major or minor scale, and when you reach the highest note, do a small squat. You don't need to go down very far—just a little bend in the knees!



High Note Squats

Sing "Do-Mi-Do" (1-3-1 on the scale) and do a small squat when you reach the higher note, "Mi."



Thirds Squats

Sing "Do-Sol-Do" (1-5-1) and squat slightly when you hit the "Sol" note (the higher note). Try to squat gently and smoothly with the music.



Fifth Squats

Sing "Do-Sol-Do" (1-5-1) and slide your voice up and down between each note. While you're singing, twist your upper body to the right on one slide, and to the left on the next one. Make sure your hips stay still, and your chin stays in line with your chest!



Twist and Sing

Sing a 5-note major or minor scale. As you reach the highest note, step forward into a lunge. Alternate legs, and step back to your starting position after you sing each scale.



Lunging Notes

Place both hands gently on the top of your head or clasp them overhead. Sing a 5-note major or minor scale.



Hands Overhead

Sing any scale pattern with hands raised over head. make sure to take breaks once in a while.



Raise your hands

Sing "Do-Sol-Do" (1-5-1) Arms out-stretched to your side when you sing "do" or the lower note, and down at your sides when you hit the "Sol" note (the higher note).



Bird Wings

Sing your scale using the sound "weeee," and make the "W" sound super big! Pretend you're going down a big slide. The exaggerated "W" helps stretch your lips and mouth for better singing.



Wee Slide

Relax your tongue and let it rest against your bottom front teeth while it feels wide and full inside your mouth, almost touching the roof of your mouth. Sing a lower-pitched scale of your choice, but keep your tongue in this fat position the whole time.



Fat Tongue Tune

Make fish lips by gently squeezing the sides of your mouth together, like a funny fish face! Keep those lips tight and sing any exercise you like while holding your fish lips. It helps stretch and relax your mouth.



Fish Lips Sing

Make a gentle fish face by squeezing your mouth a little bit and sing a scale using "wo wo woo woo woo" for each note, as if you're a friendly ghost! Make sure the "W" sound is clear on every single note.



Ghost Woos

Appendix 3

Teacher Feedback Questionnaire

This questionnaire is designed as a preliminary tool for the next phase of development for the rainbow vocal warm-up cards. In this phase, the cards would be tested in real-world educational settings, where both students' responses and teachers' feedback would be gathered. The aim would be to assess student engagement with the cards and to evaluate their usability from a teacher's perspective, ensuring that they effectively support both teaching objectives and student interaction.

Section 1: Teacher Background

1. What type of teaching do you primarily do?
 - ☐ Private voice studio
 - ☐ Musical theater
 - ☐ Choir
 - ☐ Straight theater
 - ☐ Other (please specify)
2. How many years of teaching experience do you have?
 - ☐ Less than 1 year
 - ☐ 1–3 years
 - ☐ 3–5 years
 - ☐ More than 5 years
3. What age groups do you primarily teach?
 - ☐ Children (ages 5-10)
 - ☐ Tweens (ages 11-13)
 - ☐ Teens (ages 14-18)
 - ☐ Adults

Section 2: Website Usability

4. How easy was it to navigate the website to find the vocal exercise cards?
 - ☐ Very easy
 - ☐ Easy

- Neutral
 - Difficult
 - Very difficult
5. Did you find the written instructions and videos on the website clear and helpful?
- Very clear and helpful
 - Somewhat clear
 - Neutral
 - Not very clear
 - Not clear at all
6. How likely are you to use the downloadable vocal exercise cards with your students?
- Very likely
 - Somewhat likely
 - Neutral
 - Somewhat unlikely
 - Very unlikely
7. What improvements, if any, would you suggest for the website or the layout of the materials?

Section 3: Modular Learning Tool Usability (Exercise Cards)

8. How easy was it to integrate the modular exercise cards into your lesson plan?
- Very easy
 - Easy
 - Neutral
 - Difficult
 - Very difficult
9. Did you feel the exercise cards helped students engage more with their vocal practice?
- Strongly agree
 - Agree
 - Neutral
 - Disagree
 - Strongly disagree

10. Which category of exercises (by color) did your students seem to enjoy the most?

- Red (Body stretches)
- Orange (Breath work)
- Yellow (Occluded vocal exercises)
- Green (Semi-occluded vocal exercises)
- Blue (Movement-integrated vocal scales)
- Purple (Open vocal tract exercises)

11. Did your students find it fun or empowering to choose their own warm-up exercises from the cards?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

12. How effective were the cards in helping you manage student engagement and vocal development?

- Very effective
- Somewhat effective
- Neutral
- Not very effective
- Not effective at all

Section 4: Learning Outcomes and Feedback

13. Did you learn anything new or useful from the website about vocal physiology or techniques?

- Yes, a lot
- Somewhat
- Neutral
- Not much
- No

14. Did you notice any improvements in your students' vocal technique or engagement after using the exercise cards?

- Significant improvements
- Some improvements
- Neutral
- Little to no improvements
- Not applicable

15. Would you recommend these tools to other teachers?

- Yes
- Maybe
- No

Section 5: Final Thoughts

16. Do you have any additional comments or suggestions about the modular learning tool or website?

Appendix 4

Designing Modular Teaching Tools for Optimal Student Engagement

Key Theories and Practices

- **Customization and Flexibility:** Modular tools allow educators to tailor lessons to meet the unique needs of their students. Constructivist learning theory, as described by Bruner (1966), supports this by emphasizing that learning is an active process, and when students have a say in their learning path, engagement increases.
- **Scaffolding and Sequential Learning:** Scaffolding theory (Wood, Bruner & Ross, 1976) highlights the importance of guiding learners through progressively complex tasks. In modular teaching tools, scaffolding ensures that tasks build on each other, allowing students to advance through exercises like breath control, resonance, and articulation.
- **Cognitive Load Management:** Sweller's Cognitive Load Theory (1988) emphasizes the need to break tasks into manageable chunks. Modular tools that divide learning

into distinct sections prevent cognitive overload, leading to more efficient learning and retention.

- **Engagement and Motivation:** Providing student choice within modular frameworks fosters engagement. According to Jones (2015), giving learners control over their activities keeps the learning process dynamic and personalized, enhancing motivation.

Modular Tool Design Considerations

- **Clearly Defined Learning Objectives:** Modules should have specific, measurable, achievable, relevant, and time-bound (SMART) objectives to ensure focused learning outcomes (Doran, 1981).
- **Key Components (Modules):** Each module should address a specific skill, such as breath control or resonance exercises, allowing learners to focus on individual aspects of vocal technique (Gordon, 2012).
- **Customizability:** The flexibility of modular tools, as supported by Bruner's constructivist theory (1966), allows educators and learners to mix and match modules based on needs and skill levels.
- **Scaffolding Principles:** Begin with basic exercises and gradually increase complexity, following scaffolding theory (Wood, Bruner & Ross, 1976). This helps learners build on previous knowledge.
- **Varied Learning Styles:** Gardner's multiple intelligences theory (1983) supports incorporating visual, auditory, and kinesthetic learning opportunities, ensuring the tool is effective for diverse learners.

Challenges and Solutions in Modular Tool Design

- **Complexity in Design:** The tool must balance structure and flexibility, providing clear progression paths while allowing for personalization (Wood, Bruner & Ross, 1976).
- **Pedagogical Coherence:** Ensure that combinations of modules lead to meaningful learning experiences by providing guidelines on how to best combine them (Gordon, 2012).

- **Resource and Time Constraints:** Pre-designed modules that require minimal preparation can help reduce the burden on educators who have limited time (Jones, 2015).
- **Teacher Training and Familiarity:** Professional development opportunities, such as workshops and guides, help teachers use modular tools effectively (Hattie & Timperley, 2007).
- **Cognitive Overload:** Designers should limit the number of choices presented at once and keep each module concise and focused on one learning outcome (Sweller, 1988).

Best Practices for Effective Modular Tools

- **SMART Objectives:** Each module should have clear and measurable objectives that contribute to overall learning goals (Doran, 1981).
- **Manage Cognitive Load:** Break down learning tasks to prevent overwhelming learners (Sweller, 1988).
- **Follow Scaffolding and Sequencing:** Gradually increase task complexity, starting with foundational skills (Wood, Bruner & Ross, 1976).
- **Incorporate Feedback Mechanisms:** Regular formative and summative assessments help track progress and keep learners engaged (Hattie & Timperley, 2007).
- **User-Friendly Design:** Ensure the tool is easy to navigate with minimal technical barriers (Nielsen, 1993).
- **Iterative Feedback and Evaluation:** Continuous testing and refining of the tool based on feedback from users improve its effectiveness (Kemmis & McTaggart, 2000).

Evaluating Modular Tools

- **Alignment with Learning Objectives:** Pre- and post-assessments help evaluate whether the tool meets intended learning outcomes (Anderson & Krathwohl, 2001).
- **Engagement and Motivation:** Surveys and teacher observations track student interaction and motivation (Jones, 2015).

- **Usability and Cognitive Load:** Usability studies and cognitive load surveys assess whether the tool is intuitive and manageable (Sweller, 1988; Nielsen, 1993).
- **Teacher Feedback:** Teachers' insights into how the tool integrates with lesson plans and student outcomes are essential for evaluation (Hattie & Timperley, 2007).

Appendix 5

Notes on determining Effectiveness of Student Engagement

Measuring student engagement is a multi-dimensional task that involves assessing behavioral, emotional, and cognitive aspects of how students interact with the learning process. Engagement is often described as the level of attention, curiosity, interest, optimism, and passion students show when learning. Here are several effective methods for measuring student engagement, supported by academic research:

- **Behavioral Observation**
 - Directly observing students' behavior is one of the most common methods for measuring engagement. Teachers can look for signs of active participation, such as:
 - On-task behavior: Are students paying attention and participating during lessons or activities?
 - Participation: Do they answer questions, contribute to discussions, and collaborate with peers?
 - Completion of tasks: Are assignments completed on time, and are students making an effort to produce quality work?
 - Fredricks, Blumenfeld, and Paris (2004) discuss how observing behavioral engagement—like effort, persistence, and participation—is a reliable way to assess the level of involvement students have in a task. Teachers can record these behaviors using checklists or rating scales to quantify the degree of engagement.
- **Self-Reported Surveys and Questionnaires**
 - Self-reports are another useful method for gauging student engagement. These can include:

- Likert scale questions that ask students to rate how often they feel interested, motivated, or challenged by the content.
 - Open-ended questions that give students the opportunity to express what they enjoy or struggle with in the classroom.
 - The National Survey of Student Engagement (NSSE) is a widely used tool in higher education, and similar surveys can be adapted for younger students. These surveys help assess emotional engagement, which refers to students' feelings of connection, interest, and enjoyment in the learning process (Fredricks et al., 2004).
- Focus Groups and Interviews
 - Conducting focus groups or interviews with students allows for more in-depth exploration of engagement. These methods help assess students' emotional and cognitive engagement by asking them to explain:
 - How they feel about their learning experience.
 - What aspects of lessons they find most or least engaging.
 - How they connect what they are learning to real-world applications.
 - Christenson et al. (2012) argue that focus groups and interviews provide qualitative insights into the emotional and cognitive dimensions of engagement, revealing students' motivations and how they approach learning tasks.
- Learning Analytics
 - With the rise of digital learning tools, learning analytics can provide insight into student engagement by tracking online behaviors such as:
 - Time spent on tasks.
 - Frequency of logins or page visits.
 - Click patterns, interactions with course materials, and participation in discussion forums.
 - Siemens and Baker (2012) suggest that learning analytics can be used to identify students who are at risk of disengagement by analyzing patterns of online behavior. These analytics can quantify both behavioral and cognitive engagement.
- Classroom Response Systems (Clickers) and Polls

- Using real-time feedback tools such as clickers or polling apps helps measure real-time engagement by requiring students to actively participate in class. These tools allow teachers to see how many students are paying attention and understanding the material in real-time.
- Cain and Robinson (2008) found that students who use clickers in the classroom show higher levels of engagement because they are required to participate actively throughout the lesson.
- Peer Review and Collaboration
 - Observing how students engage in group work and peer review activities can give insights into their social engagement. How students interact with each other during collaborative tasks, the quality of feedback they give, and how actively they participate in group discussions are all important indicators of engagement.
 - Topping (1998) emphasizes that peer review and collaborative activities promote cognitive engagement, as students are required to think critically and offer constructive feedback to their peers.
- Reflection Journals
 - Students can be asked to keep reflection journals where they regularly write about their learning experiences, what they find interesting, or what challenges they encounter. These journals offer insight into their cognitive engagement by showing how deeply they are thinking about the material.
 - Moon (2006) argues that reflective practice encourages metacognitive engagement, where students become more aware of their learning process and are able to self-regulate their efforts more effectively.
- Performance and Learning Outcomes
 - While student engagement and academic achievement are not the same, improved performance and learning outcomes can sometimes indicate higher engagement. Tracking grades, assessment scores, and progress over time helps measure the effectiveness of teaching methods and whether students are truly engaged with the material.
 - Hattie (2008) notes that deep learning and student engagement are correlated, with engaged students typically showing stronger performance on formative and summative assessments.

- Measuring student engagement involves a combination of behavioral observation, self-report tools, focus groups, learning analytics, and performance tracking. Combining these methods provides a comprehensive view of how students are interacting with the material, their peers, and the overall learning process. Effective engagement measurements allow educators to adjust their teaching methods and enhance student motivation, ultimately improving learning outcomes.

Appendix 6

Designing Audio/Video Aids for Modular Teaching Tools and Websites

Notes on Creating Audio/Video Aids:

- Creating an effective video aid to accompany your modular teaching tool involves several best practices in instructional design, multimedia learning, and video production. Here are the key steps and considerations, supported by academic sources, to ensure that your video aid enhances learning and integrates well with the modular teaching tool:
- Align Video Content with Learning Objectives
 - The video aid should be closely aligned with the learning objectives of each module. This ensures that the video serves as a direct reinforcement of the learning material presented in your tool. Gagné's Nine Events of Instruction (Gagné, 1985) suggests that videos should provide clear learning outcomes at the start, demonstrate concepts, and provide opportunities for learners to practice through guided instruction. Best Practice: State the learning goals clearly at the beginning of the video. For example, "In this module, we will explore diaphragmatic breathing techniques to support healthy vocal production."
- Keep Videos Concise and Focused
 - Videos should be short and focused on a single concept or activity to maintain student engagement and prevent cognitive overload. Research on cognitive load theory (Sweller, 1988) emphasizes that too much information at once can overwhelm learners. Break down the content into manageable

segments so that each video aligns with a specific part of the modular tool.

Best Practice: Aim for videos that are no longer than 5-7 minutes for each module. Each video should explain and demonstrate one aspect of the tool, such as breath control, resonance, or vocal articulation, ensuring focus on one key concept per video.

- **Use Multimedia Principles to Enhance Learning**
 - According to Mayer's Multimedia Learning Theory (Mayer, 2001), effective educational videos should use both visual and auditory elements to enhance understanding. Some of the key principles include:
 - **Signaling:** Highlight important information using visual or verbal cues. For example, when explaining vocal techniques, use arrows or text to highlight the correct placement of the tongue or the diaphragm.
 - **Modality:** Present information using both narration (audio) and visuals (video demonstration) to support dual-channel processing in learners.
 - **Redundancy:** Avoid presenting the same information in both text and narration at the same time, as this can increase cognitive load.
 - **Best Practice:** Use voiceover to explain vocal techniques while showing close-ups of the physical movements involved, such as breath support or lip posture. Make sure the visual and audio elements complement each other without duplicating the same content.
- **Incorporate Real-Life Demonstrations**
 - Demonstrating the application of the exercises in a real context will make the content more relatable and engaging for learners. In the context of vocal pedagogy, showing real students or instructors performing the exercises will make it easier for learners to model their behavior. **Best Practice:** Film short segments of students performing the vocal exercises, focusing on correct form. This allows learners to see how the exercises are applied in practice.
- **Include Interactivity When Possible**
 - Research has shown that interactive elements in videos, such as quizzes, polls, or opportunities to pause and reflect, can greatly enhance engagement and retention (Zhang et al., 2006). While creating an interactive video can be more resource-intensive, using video platforms that allow viewers to pause, reflect, or engage with content during the video enhances cognitive

engagement. Best Practice: Add prompts in the video encouraging learners to pause and practice the exercise being demonstrated. For example, "Pause the video and try the lip trill exercise. Focus on maintaining breath support throughout."

- Provide Clear Instructions and Visual Cues
 - Clarity is key in instructional videos. Ensure that the instructions are easy to follow and supported by clear visual cues. Use text overlays, diagrams, and slow-motion footage to clarify complex concepts. Best Practice: When explaining how to control breath or position the lips for a semi-occluded vocal tract exercise, use text labels to name each step or key aspect of the exercise. Arrows or highlighting tools can also be used to focus attention on the physical components of each exercise.
- Ensure Accessibility
 - Ensure your videos are accessible to all learners by including closed captions and ensuring that audio is clear and of high quality. Providing captions also enhances retention for learners with different needs (Moreno & Mayer, 1999). Best Practice: Add subtitles to all videos to make the content accessible for learners with hearing impairments and to improve understanding for all viewers.
- Use a Professional Tone and High-Quality Production
 - While the content is the most important part of the video, high-quality production helps maintain learner engagement. This means:
 - Clear, high-definition video quality.
 - Good lighting and sound.
 - Professional voice overs or clear audio recordings. Using a professional tone and ensuring a polished look can enhance the credibility and trustworthiness of your instructional videos.
 - Best Practice: Invest in a good microphone and camera setup. Ensure the audio is clear, and avoid background noise. If necessary, hire a professional to help with video editing and production.
- Provide Follow-Up Resources
 - At the end of the video, point learners to further resources or the next steps in the modular tool. This can be in the form of additional readings, practice

exercises, or the next module in the sequence. Encourage learners to revisit the video as needed while using the tool. Best Practice: Conclude each video with a call to action, such as "Now, try this exercise in your practice session and check back with the next module for more techniques."

- An effective video aid for your modular teaching tool should align with learning objectives, be concise and focused, leverage multimedia principles, and incorporate demonstrations and interactive elements. By following these best practices, you can create videos that enhance learner engagement and understanding while supporting the flexibility and structure of your modular tool.

Appendix 7

Key Considerations for Designing an Effective Educational Web Page

- **Organize Content Logically**
 - Presenting material in a clear, structured way is essential for facilitating understanding. A logical flow, starting from basic concepts and gradually moving to more complex ideas, helps educators grasp the material more easily. A well-organized webpage improves cognitive load management, which is crucial for effective learning (Sweller, Ayres & Kalyuga, 2011).
- **Use Multimodal Instruction (Text, Video, Graphics)**
 - Incorporating multiple forms of media, such as text, videos, and diagrams, is proven to enhance comprehension and retention. Mayer's (2009) multimedia learning theory highlights that combining visual and verbal information is more effective for learning than using either alone, particularly for complex topics like vocal physiology.
- **Provide Clear, Concise Explanations**
 - Content should be presented in concise, easy-to-understand language, especially when introducing complex topics like the physiology of singing. Simplifying complex terminology without oversimplifying the content is essential for educators with varying levels of prior knowledge (Ambrose et al., 2010).
- **Interactive Elements for Engagement**

- Providing downloadable resources, such as vocal exercise cards, allows for interactive learning. Active learning techniques, like self-assessment or learner-selected activities, increase engagement and help educators apply the content in real-world teaching scenarios (Bonwell & Eison, 1991).
- **Provide Opportunities for Self-paced Learning**
 - Allowing educators to navigate through the content at their own pace is key to effective online learning. Educators should be able to revisit sections as needed, enabling self-directed learning and deeper engagement with the material (Knowles, 1984).
- **Use Scannable Text and Headings**
 - For online material, using headings, bullet points, and concise paragraphs helps educators quickly scan and find the information they need. Research indicates that educators prefer content that is easy to navigate and digest, particularly on digital platforms (Nielsen, 2006).
- **Include Practical Application Examples**
 - Illustrating theoretical concepts with practical examples, such as exercises and lesson plans, helps bridge the gap between theory and practice. Educators benefit from seeing how the material can be applied in real classroom or studio settings (Brookfield, 2009).
- **Ensure Mobile and Cross-platform Accessibility**
 - Web Pages should be optimized for mobile and various devices to ensure accessibility. Research shows that educators often access content on different devices, so ensuring cross-platform compatibility enhances usability (Norman & Nielsen, 2012).

Appendix 8

Key Considerations for Web Page Content Development

Vision:

To revolutionize music and voice education by equipping educators with innovative tools that enhance their teaching effectiveness and inspire the next generation of young singers.

Mission:

Through the development of targeted teaching tools, I aim to provide educators with comprehensive guidelines for working with young singers under 18. These tools will focus on developmentally appropriate and effective warm-ups and pitch exercises, ensuring that young voices are nurtured and developed healthily.

Values:

1. **Educational Excellence:** Commitment to high-quality, evidence-based guidelines that ensure the best outcomes for young singers.
2. **Child Development:** Ensuring all exercises and practices are age-appropriate and supportive of healthy vocal growth.
3. **Inclusivity:** Creating accessible tools that benefit all young singers, regardless of background or experience level.
4. **Creativity and Engagement:** Designing captivating and inspiring warm-ups and pitch exercises to make learning enjoyable and effective.
5. **Professional Support:** Providing educators with practical resources to enhance their teaching practices and support their professional growth.
6. **Empowerment:** Fostering a learning environment that builds confidence and technical skills in young singers, helping them realize their full potential.

SHORT VERSION:

My vision is to revolutionize music and voice education by equipping educators with innovative tools that enhance their teaching effectiveness and inspire the next generation of young singers. Through the development of targeted teaching tools, I aim to provide comprehensive guidelines for working with young singers under 18, focusing on developmentally appropriate and effective warm-ups and pitch exercises. This work is underpinned by values of educational excellence, child development, inclusivity, creativity, professional support, and empowerment.

Why Statement:

I am dedicated to creating tools for music and voice educators because I have witnessed firsthand the damage caused to young voices by incorrect direction in choirs, plays, and

musicals. Many educators design their curricula based on entertainment and personal ego rather than prioritizing healthy child development. My mission is to ensure that young singers receive the proper guidance they need to develop their voices safely and effectively, fostering a foundation for lifelong vocal health and success.

Setting Clear Goals for Effective Vocal Training

When designing warm-ups and exercises for children (and also for adults), it is crucial to be clear about the specific goals we want to achieve. Research highlights four primary areas that should guide this process:

1. Physical Warm-Ups and Cool-Downs

These exercises are vital for preparing the tissues and muscles involved in singing, ensuring healthy vocal production. Studies show that proper warm-ups increase blood flow to the vocal folds, reduce muscle tension, and enhance flexibility, which are essential for preventing vocal strain and promoting efficiency (Titze & Verdolini Abbott, 2012; McCoy, 2012). Cool-downs, on the other hand, help to relax the vocal muscles after singing, reducing the likelihood of fatigue and injury (Boone et al., 2013). My research in Module 4 on the effects of warm-ups and cool-downs on vocal fold physiology provides strong evidence supporting the design of these exercises for children, whose vocal folds are still developing.

2. Breath Control and Body Coordination

Effective breath control and body coordination are foundational to healthy singing. Exercises in this area focus on the interaction between breath and the body, with an emphasis on developing efficient breath support and coordination between the respiratory system and vocal folds. Research by Sundberg (1987) and Titze (2000) underscores the importance of the breath-body connection in regulating airflow for smooth phonation and maintaining control over vocal dynamics. Teaching singers to manage their breath properly is a key factor in both vocal endurance and the ability to produce sustained, resonant sound.

3. Vowel Shapes, Consonants, and Acoustics

The understanding of vowel shapes and consonants, and their influence on resonance and formants, is another critical component of vocal training. Vowel modification is known to affect the acoustic properties of the voice, helping singers produce clearer, more powerful tones (Sundberg, 2009). Exercises that focus on vowel and consonant articulation teach singers how to use the vocal tract's natural resonance to enhance projection and improve vocal quality. Introducing these concepts gradually to children is particularly important, as they must develop an awareness of how vowel shaping and consonants impact their singing.

4. Pitch and Cultural Tonal Patterns

In addition to anatomy and physiology, vocal training must also address the recognition and reproduction of tonal scales and patterns that are specific to the musical culture of the singer. These exercises aim to train the ear and mind, helping singers to navigate pitches and scales accurately. As noted by Gordon (2012), tonal pattern training enhances pitch accuracy and musical memory, particularly in children who are still developing their tonal understanding. For young singers, engaging with the cultural aspects of music fosters a deeper connection to the musical repertoire and improves their ability to sing within the stylistic context of their culture.

Overlapping Areas and Focusing on Primary Objectives

While one or more of these areas often overlap in a single exercise, it is essential to identify the primary objective of each session. For example, when the primary goal is a warm-up or cool-down, the focus should be on preparing or relaxing the vocal folds, ensuring efficient breath control, or working on resonance without overloading the singer (Titze, 2000). By clearly understanding the main goal—whether it's preparing the voice physically, managing breath, or working on acoustics—we ensure that the exercises are targeted and effective in supporting long-term vocal health and technique.

Next, it's important to take a closer look at the range of exercises available to us. By understanding the different types of exercises and their specific functions, we can better tailor our approach to meet the unique needs of our singers. Whether we're focusing on breath control, vocal resonance, articulation, or pitch accuracy, having a clear

understanding of the available tools will help us design effective, goal-oriented practice routines.

TYPES OF EXERCISES:

There are three types of vocal warm up and vocal exercises. In my experience, Occluded and Semi-occluded vocal exercises seem to be generally underutilized.

1. Occluded Vocal Tract Exercises

Definition: Occluded vocal tract exercises involve fully blocking or closing part of the vocal tract, such as the mouth or nose, to create resistance against the airflow. These exercises are typically used to reduce phonation threshold pressure and encourage efficient vocal fold vibration. Examples:

- Humming: This exercise closes the mouth, allowing sound to resonate through the nasal cavity. (Make sure the tongue is actually relaxed: forward and touching the roof of the mouth.)
- Nasal consonants (like "m," "n"): These exercises restrict airflow through the mouth while engaging the nasal passages.

2. Semi-Occluded Vocal Tract Exercises (SOVT)

Definition: Semi-occluded vocal tract exercises partially close the vocal tract to create back pressure. This resistance helps balance subglottal pressure and encourages efficient vocal fold closure, promoting healthier vocal production. SOVT exercises are frequently used in both vocal training and therapy. Examples:

- Straw Phonation: Singing or phonating through a straw, creating resistance to airflow.
- Lip Trills (or "blowing raspberries"): Partially occluding the lips while phonating, which reduces tension in the vocal folds.
- V or Z sound phonation: Using voiced fricatives to semi-occlude the vocal tract.

3. Open Vocal Tract Exercises

Definition: Open vocal tract exercises involve no occlusion or blockage of the vocal tract, allowing the airflow to pass freely through the mouth or nose. These exercises focus on free and unrestricted sound production, often used to develop resonance, breath control, and vocal tone. Examples:

- Sustaining vowel sounds: Singing vowels like "ah" or "ee" without any resistance from the lips or articulators.
- Singing scales or melodies: Using an open vocal tract to practice vocal passages without occlusion.

The effectiveness of Semi-Occluded Vocal Tract (SOVT) exercises in balancing subglottal pressure is grounded in the principles of vocal fold mechanics and airflow physics. Understanding the science behind how these exercises work helps explain their benefits in vocal training.

1. Subglottal Pressure and Vocal Fold Vibration

Subglottal pressure refers to the air pressure generated below the vocal folds by the lungs during phonation. For healthy vocal fold vibration, there needs to be a balance between the subglottal pressure (below the folds) and the supraglottal pressure (above the folds, in the vocal tract) (Titze, 2000). If this balance is disrupted, the vocal folds may vibrate inefficiently, leading to vocal fatigue or strain.

2. Semi-Occlusion Creates Back Pressure

In SOVT exercises, the vocal tract is partially occluded at the mouth (e.g., using a straw or during lip trills), creating resistance to the outgoing airflow. This resistance generates back pressure that reflects back toward the vocal folds, helping to equalize the pressure across the vocal tract and the vocal folds (Sundberg, 2009). The even distribution of pressure reduces the effort needed for the vocal folds to vibrate, enhancing vocal efficiency.

3. Bernoulli's Principle and Flow Regulation

The Bernoulli Effect explains that when air flows through a constricted space, such as a semi-occluded vocal tract, the airflow velocity increases while pressure decreases. This

reduction in pressure at the point of constriction facilitates smoother vocal fold vibration (Boone et al., 2013). The lower pressure helps the vocal folds meet more easily and vibrate more efficiently with less muscular effort.

4. Reduction in Phonation Threshold Pressure (PTP)

Phonation threshold pressure (PTP) is the minimum amount of subglottal pressure required to initiate vocal fold vibration (Titze, 2000). SOVT exercises are effective because they lower PTP by allowing airflow to be managed more efficiently across the glottis. Research by Titze (2000) and Verdolini Abbott et al. (1998) shows that when airflow is better regulated through semi-occlusion, the vocal folds vibrate with less effort, making phonation easier and reducing the risk of vocal fatigue.

5. Impedance Matching

Impedance matching refers to the need for an optimal balance between the airflow resistance at the vocal folds and the resistance in the vocal tract (Titze, 2006). SOVT exercises help to create this impedance matching by regulating airflow and ensuring that the vocal folds encounter less resistance during vibration. The back pressure from semi-occlusion aids in this process, leading to more efficient energy transfer, which protects the vocal folds from overuse (Titze & Verdolini Abbott, 2012).

6. Flow Phonation and Resonance

SOVT exercises also promote flow phonation, where the airflow and vocal fold vibration are optimized (Verdolini Abbott et al., 2012). By partially closing the vocal tract, these exercises encourage the use of the vocal tract's natural resonance. According to Sundberg (2009), this natural resonance enhances the voice's projection and fullness without the need for excessive force, making it easier for the vocal folds to oscillate smoothly and healthily.

Summary of Key Physics Principles:

- **Back Pressure:** Partial occlusion of the vocal tract reflects pressure back to the vocal folds, helping balance subglottal and supraglottal pressures (Titze, 2000; Sundberg, 2009).

- Bernoulli Effect: As airflow velocity increases through a constriction, pressure decreases, facilitating easier vocal fold vibration (Boone et al., 2013).
- Phonation Threshold Pressure: SOVT exercises reduce the PTP, allowing for easier vocal fold vibration and less vocal fatigue (Titze, 2000; Verdolini Abbott et al., 1998).
- Impedance Matching: SOVT exercises improve the efficiency of energy transfer between the vocal folds and vocal tract, protecting the voice from strain (Titze, 2006).
- Flow Phonation and Resonance: These exercises encourage natural resonance, promoting more efficient vocal fold vibration and better sound projection (Verdolini Abbott et al., 2012).

The amount of time children should sing without a break and the total duration of singing sessions varies depending on their age, vocal development, and the type of singing activity. It's important to approach this with caution to avoid vocal strain or fatigue, especially since children's vocal folds are still developing.

1. Singing Time Without a Break

- Research suggests that children should not sing for prolonged periods without rest. A good rule of thumb is to limit continuous singing to about 10-15 minutes before taking a short break, especially for younger children (ages 6-12) (Boone et al., 2013). Short breaks allow the vocal folds to recover, preventing fatigue and potential strain.

2. Total Singing Time

- For a full session, it's recommended that children should not sing for more than 30-45 minutes total in one sitting, depending on their age and vocal stamina (Welch & Sundberg, 2002). For younger children (under 12), shorter sessions of 20-30 minutes are often ideal, broken into intervals with regular rests.

Academic Support:

- Boone et al. (2013) explain that young voices are particularly susceptible to strain due to the still-developing nature of their vocal folds, which are more elastic and prone to fatigue than adult voices.

- Welch & Sundberg (2002) also emphasize the importance of balancing singing with vocal rest in educational settings, ensuring that children do not overuse their voices in a single session.

Key Considerations:

- Vocal Cool-Downs and Rest: After any singing session, children should also be encouraged to perform vocal cool-downs and rest their voices to promote recovery.
- Varied Activities: Alternating between singing, listening, and movement-based activities can also extend practice sessions without overloading the voice.

In summary, children should ideally sing for no longer than 10-15 minutes continuously without a break and limit their total singing time to 30-45 minutes per session, depending on their age and vocal development.

Appendix 9

Artifact & Appendix Reference List

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