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Application of Complete Vocal Technique (CVT) in Popular Vocal Music Education: A Research on Teaching Strategies to Promote Learners' Stylistic Authenticity and Personalized Expression

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Abstract: *This study aims to explore the role of Complete Vocal Technique (CVT) in popular vocal music education in enhancing learners' stylistic authenticity and personalized expression. With the diversified development of the pop music market, singers not only need to master solid vocal skills but also need to develop distinct personal characteristics and artistic identities in their vocal performances (Moore, 2002). Existing research shows that CVT divides the human voice into four modes: Neutral, Curbing, Overdrive, and Edge, and integrates the research results of physiological acoustics, providing singers with a systematic tool for constructing authenticity and achieving personalized expression across musical styles (Sadolin, 2012; Leppävuori, Laukkanen & Kankare, 2021). Based on a systematic review of existing research results, this study, combined with typical case analysis, proposes a teaching strategy framework with CVT as the core, and further elaborates on its innovativeness, future application value, and research limitations. The study finds that the mode training of CVT can not only improve learners' voice control ability and vocal safety but also help them flexibly choose styles according to different musical contexts and achieve personalized expression. The research results provide popular vocal music educators with a new theoretical perspective and practical path and have guiding significance for future music education and interdisciplinary research.*

Keywords: Complete Vocal Technique (CVT); Popular Vocal Music Education; Stylistic Authenticity; Personalized Expression; Teaching Strategy

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1. Introduction

With the development of digital media and the global music market, pop music has become a vital component of contemporary music culture. Unlike traditional classical vocal education, which emphasizes a unified timbre and idealized acoustic standards, pop vocal education places greater focus on vocal diversity, individuality, and stylistic authenticity. In the highly competitive music industry, a singer's success depends not only on solid technical skills but also on their ability to demonstrate highly recognizable vocal characteristics and a unique artistic style (Young, 2013). Complete Vocal Technique (CVT) is a rapidly developing modern vocal training system founded by Danish vocal educator Catherine Sadolin. Based on the physiological and acoustic mechanisms of the human voice, this system classifies vocal

methods into four modes: Neutral, Curbing, Overdrive, and Edge, and explicitly proposes the concept that "all sounds can be produced safely" (Sadolin, 2012). This approach breaks through the limitations of previous experiential vocal teaching, enabling singers to expand vocal expressiveness across styles safely and effectively—for example, using Overdrive mode to enhance mid-high range power for Pop Rock, or Edge mode for high-range penetration in Lyric CCM.Although existing studies have confirmed the scientific validity and practicality of CVT (Leppävuori et al., 2019, 2020, 2021), there remains a lack of systematic research on how it specifically promotes learners 'stylistic authenticity and individualized expression. Integrating technical mastery with the cultivation of artistic style has become a core challenge in current pop vocal education. By reviewing relevant literature and conducting case studies, this research proposes a CVT-based teaching strategy framework, aiming to address the gaps in existing studies and provide references for future educational practice and research.

2. Literature Review

2.1 Theoretical and Empirical Foundations of Complete Vocal Technique (CVT)

The core contribution of CVT lies in the scientific and systematic classification of vocal modes. Sadolin (2012) categorized the human voice into four primary modes, emphasizing that this classification is based on differences in laryngeal muscle coordination and vocal fold working meisms, rather than the traditional division by vocal range.

Leppävuori et al. (2019) conducted studies using high-speed laryngoscopy and electroglottography, revealing significant differences in vocal fold closure patterns and vibration amplitude across different CVT modes. With the application of magnetic resonance imaging (MRI) technology (Leppävuori et al., 2020), variations in vocal tract morphology under different modes were uncovered. Further acoustic analysis demonstrated that these modes exhibit stable characteristic differences in resonance and frequency distribution (Leppävuori, Laukkanen & Kankare, 2021). These studies provide a solid foundation for the scientific validity of CVT.

After receiving CVT training, untrained singers show significant improvements in both vocal range and voice quality. Subsequent research has even applied CVT to voice disorder rehabilitation, finding it feasible and effective in treating muscle tension dysphonia (MTD) (McGlashan, Laukkanen & Kankare, 2023a, 2023b). These results indicate that CVT is not only applicable in the field of education but also holds clinical application value.

2.2 Uniqueness and Developmental Needs of Pop Vocal Education

Contemporary Commercial Music (CCM) vocal education faces significant pedagogical challenges due to the lack of a unified, evidence-based framework specifically designed for non-classical singing styles. Unlike classical vocal training, CCM emphasizes vocal diversity and stylistic adaptability across numerous genres that emerged in the twentieth century (Naismith, 2019). Current CCM instruction largely relies on experiential teaching methods rather than systematic pedagogy, creating difficulties in meeting the demands of diverse musical styles (Bartlett & Naismith, 2020; Кулага, 2020)

Research indicates that many CCM instructors lack formal training in teaching these styles, with substantial percentages having neither specialized education nor professional experience in CCM (Lovetri & Weekly, 2003). The field requires specialized knowledge addressing style-specific technical requirements, vocal health needs, and performance practices that differ significantly from classical approaches (Chandler, 2014; de Villiers & Gillmer, 2024). Recent

studies emphasize the necessity for developing comprehensive curricular frameworks that incorporate CCM-specific elements including stylistic advice, microphone techniques, and cultural context to better serve contemporary singers (Sear, 2023; Powell & Smith, 2024).

2.3 Philosophical and Aesthetic Foundations of Stylistic Authenticity

The "authenticity" of musical performance has long been a key topic in musicology and aesthetics. Moore (2002) suggested that authenticity can be divided into "first-person authenticity" (loyalty to oneself), "second-person authenticity" (consistency with the audience), and "third-person authenticity" (adherence to tradition or style). Young (2013) argued that authenticity is a dynamically constructed process, emphasizing that performers need to remain faithful to the current context. From an ontological perspective, Stoicescu (2020) demonstrated the complexity of musical authenticity, noting that authenticity not only involves the faithful reproduction of works but also includes the interactive construction between performers and the audience.

2.4 Individualized Expression and Interdisciplinary Support

In terms of individualized expression, the integration of technique and emotion is crucial. The personalized singing voice synthesis method proposed by Cen, Dong & Chan (2012) shows that it is feasible to retain personal timbre while meeting stylistic norms. A study by Gómez-Cañón et al. (2021) indicated that music emotion recognition systems need to focus on individual differences and situational dynamics, which is highly consistent with the demand for "personalized emotional expression" in pop vocal education.

Yang's (2022) research on voice feature extraction and Qin's (2025) deep learning data fusion system provide objective evaluation tools for vocal teaching, enabling the establishment of a quantitative connection between technique and emotion. The "voice-persona" model proposed by Noufi, May & Berger (2024) emphasizes that voice identity is a context-based dynamic construction, offering a new theoretical basis for the formation of personalized identity in pop vocal education.

2.5 Research Gaps

Although numerous studies have confirmed the scientific validity and practicality of CVT, the following gaps remain:

i. The direct connection between CVT and stylistic authenticity has not been fully explored, as most studies focus on physiological and acoustic aspects.
ii. Research on personalized teaching strategies is relatively limited, lacking specific guidance for individualized teaching.
iii. The degree of interdisciplinary integration is insufficient, and there has been no in-depth integration of emotion recognition, artificial intelligence data analysis, and vocal teaching. Based on this, this study attempts to propose a systematic teaching strategy framework to explore how CVT can help learners achieve the organic unification of technique, style, and individuality.

3. Research Methodology

3.1 Literature Analysis

A systematic review was conducted on CVT theoretical and empirical studies (Sadolin, 2012; Leppävuori et al., 2019, 2020, 2021), pop vocal education frameworks (Naismith, 2019), authenticity theories (Moore, 2002; Young, 2013; Stoicescu, 2020), and interdisciplinary

research on individualized expression (Cen et al., 2012; Cañón et al., 2021; Yang, 2022; Qin, 2025; Noufi et al., 2024).

3.2 Case Analysis

Research on music case analysis encompasses diverse applications across education, technology, and therapeutic contexts. In music education, case studies have been developed to document teaching practices and decision-making skills of instrumental music educators, covering areas like curriculum development, classroom management, and student rapport (Conway, 1999). Based on the research by McGlashan et al. (2023a, 2023b), this study examines the application of CVT in expanding vocal range, improving voice quality, and treating voice disorders. It focuses on analyzing how CVT, through technical training, helps students achieve individualized expression across different styles and contexts.

4. Research Results and Discussion

4.1 Vocal Type Positioning Based on Pitch Assessment Consolidating the Vocal Range Foundation for Stylistic Authenticity and Individuality

Vocal type, as the "innate tone" of the voice, provides a basic reference for learners' adaptability to different styles—but it does not constitute an absolute constraint. CVT's four-mode system can help break through partial limitations of vocal type (e.g., a Baritone can use Overdrive mode to enhance mid-high range power, expanding adaptability to Pop Rock). If the vocal type mismatches the vocal range required by a style without CVT compensation, it will not only weaken stylistic authenticity but also limit the space for individualized expression. Scientific pitch assessment is required to identify the core comfortable vocal range. Combining the vocal range requirements of mainstream pop music styles, a "vocal type-vocal range-style adaptation" three-dimensional reference system (Table 1) should be constructed to provide a basis for subsequent style selection and technical application.

Table 1: Reference Table for Voice Types, Vocal Ranges, and Mainstream Style Adaptation in Popular Singing

Voice Type	Common Extended Vocal Range	Typical Timbre Characteristics	More Suitable Styles	Potentially Unsuitable Styles
(Tenor)	G2 - C5	Bright and clear, with strong explosive power in the high range	Rock, Pop Rock, High-range Lyric CCM	Low-frequency Blues, Jazz Bass
(Baritone)	E2 - A4	Warm and mellow, with full resonance in the mid - low range	R&B, Mainstream Jazz, Narrative Folk	Pop Coloratura, Female Rock
(Bass)	B1 - F4	Deep and heavy, with prominent low - frequency tension	Low-frequency Blues, Jazz Bass, Low-frequency Rap	Pop Coloratura, High-range Rock
(Soprano)	G3 - C6	Clear and agile, with strong penetration in the high range	High-range Lyric CCM, Female Rock,Pop Coloratura	Low-frequency Jazz, Low Folk
(Mezzo-Soprano)	E3 - A5	Full and soft, with delicate emotional expression in the mid - range	Soul, Full-range R&B, Mid-range Lyric Pop	Ultra-high Coloratura, Extreme Rock
(Alto)	B2 - F5	Mellow and magnetic, with prominent low - frequency texture	Low-frequency Jazz, Low Folk, Low-frequency Blues	High-range Lyric

Tenor: Its core advantage lies in its high-range explosive power and bright timbre. Therefore, it is suitable for rock music (which requires high-range tension), pop rock, and high-range-oriented lyrical CCM (which requires high-range penetration). However, it lacks sufficient low-frequency resonance, failing to meet the low-frequency texture requirements of low-frequency Blues. It also lacks the ultra-low-frequency support capability needed for the Jazz Bass section.

Baritone: It has full resonance in the mid-low range and a warm timbre, making it suitable for R&B (which requires mid-low range vocal turns), mainstream Jazz (which requires a relaxed mid-low range), and narrative folk music (which requires a stable mid-range for storytelling). Nevertheless, its upper vocal range limit is insufficient—it cannot perform the ultra-high-range techniques required for Pop Coloratura, nor does it have the high-range tension above C5 needed for female-style rock.

Bass: It features prominent low-range tension and a heavy timbre, so it is suitable for low-frequency Blues (which requires low-frequency resonance), the Jazz Bass section (which requires stable ultra-low-range vocalization), and low-frequency Rap (which requires clear articulation in the mid-low range). However, it lacks ultra-high-range flexibility and cannot handle Pop Coloratura. Additionally, its high-range explosive power is far from meeting the vocal range requirement above A4 for high-range rock.

Soprano: It has strong penetration in the high range and a clear timbre, adapting well to high-range-oriented lyrical CCM (which requires emotional outbursts in the high range), female rock (which requires mid-high range tension), and Pop Coloratura (which requires ultra-high-range techniques). Yet, it has insufficient low-frequency magnetism, making it hard to create the atmosphere of low-frequency Jazz. Its core vocal range also lacks low-frequency coverage below F3, so it cannot adapt to low-range folk music.

Mezzo-Soprano: It delivers delicate emotional expression in the mid-range and has a soft timbre, suiting Soul music (which requires switching between breathy voice and chest voice in the mid-range), full-range R&B (which requires vocal turns across the full range), and mid-range-oriented lyrical pop (which requires emotional depth in the mid-range). However, its upper vocal range cannot reach the requirement of above C6 for ultra-high-range Coloratura, and it also lacks the high-range tension above G5 needed for extreme rock.

Alto: It has prominent low-range texture and a mellow timbre, making it suitable for low-frequency Jazz (which requires a lazy texture in the mid-low range), low-range folk music (which requires a mellow mid-range), and low-frequency Blues (which requires deep emotions in the mid-low range). But it has insufficient brightness and penetration in the high range, failing to adapt to high-range-oriented lyrical CCM. It also lacks the ultra-high-range flexibility above C5, making it difficult to handle Pop Coloratura.

4.2 Personalized Path for CCM Singing: Connection Between the 4-Step Positioning Method and CVT Training

To achieve “stylistic authenticity + personal recognition” in CCM (Contemporary Commercial Music) singing, it is necessary to combine the 4-Step Positioning Method with CVT training based on vocal type positioning, ensuring that techniques serve style and expression:

Step 1: Half-Tone Vocal Type Self-Assessment – Define Core Vocal Range
Test your vocal range in half-tones: start from your natural lowest note and sing upward in half-tones. Record the vocal range where you can sing "without vocal strain, with stable breath, and natural timbre." Compare it with Table 1 to initially identify your vocal type, which defines the physiological boundaries for subsequent CVT training directions (e.g., high-range enhancement, low-frequency resonance improvement).

Step 2: Style Matching via Table 1 – Clarify CCM Sub-Style Direction
Based on your preliminary vocal type, select suitable CCM sub-styles from Table 1 (e.g., Tenors choose High-range Lyric CCM; Mezzo-Sopranos choose Mid-range Dynamic CCM). Avoid styles that conflict with your vocal range or timbre without CVT compensation (e.g., Baritones avoid high-range Rock unless Overdrive mode is trained) to ensure the training starting point aligns with your vocal type advantages while reserving room for CVT expansion.

Step 3: Analyse Core Style Elements – CVT Technique Adaptation Training
Focus on the key traits of your selected CCM style and match them with targeted CVT mode practice to consolidate the foundation of stylistic authenticity:

Rhythm: For Lyric CCM, practice steady beats with Neutral Mode (stable mid-low range); for Upbeat CCM (e.g., Pop Rock-style CCM), practice dynamic syncopation with Overdrive Mode (mid-high range power);

Articulation: For Lyric CCM, use soft and connected articulation; for Rhythmic CCM, use clear and crisp articulation. Combine CVT Curbing Mode (balance between breathy voice and chest voice) to adjust articulation intensity;

Specialized Techniques: For long phrases, practice breath control with Neutral Mode; for high-range outbursts (e.g., Lyric CCM climaxes), practice Edge Mode; for mid-high range power (e.g., Pop Rock CCM), practice Overdrive Mode; for delicate mid-low range expression (e.g., Soul-style CCM), practice Curbing Mode.

Step 4: Integrate Personal Traits – CVT-Assisted Personalized Expression
After mastering core style techniques, refine and integrate personal characteristics through CVT modes – for example, retain your unique articulation rhythm when using Edge Mode, or add distinctive breathy voice processing when using Curbing Mode. This avoids "generic singing" and ultimately achieves "style consistency + personalized expression."

In-Class Teacher Practice: CVT-Oriented Competence Assessment and Training Form (Table 3)
To accurately track learning progress and optimize CVT training plans, design a "Competence Assessment Form" (Table 3). From dimensions such as "vocal range adaptation" and "timbre conformity," identify weaknesses through "student self-rating + teacher observation," then match corresponding CVT modes and training content to form a closed loop of "Assessment-Training-Improvement."

Table 3: CCM Singing Competence Assessment and Corresponding CVT Training Form

Dimension	Specific Questions	Student Self-Rating (1-5)	Recommended Corresponding CVT Modes / Exercises
Vocal Range Adaptation	Is my comfortable vocal range (with CVT) compatible with the style of the selected song?	□1 □2 □3 □4 □5	Neutral Mode (mid-low stability) / Edge Mode (high-range expansion) / Overdrive Mode (mid-high-power enhancement)
Timbre Conformity	Does my timbre (via CVT) approach the typical texture of this style?	□1 □2 □3 □4 □5	Curbing Mode (breathy-chest balance) + resonance adjustment exercises; Overdrive Mode (mid-high-power texture)
Expressive Freedom	Can I freely add vocal turns, breathy sounds, or articulation changes (via CVT) within this style?	□1 □2 □3 □4 □5	Personalized vocal turn exercises (with Neutral/Overdrive Mode); breathy voice adjustment (with Curbing Mode)
Technical Stability	Are my key CVT techniques (e.g., Edge high notes, Overdrive mid-high power, Curbing breathy control) stable?	□1 □2 □3 □4 □5	Targeted CVT technical training (e.g., Edge Mode high-note sustain, Overdrive Mode mid-high-power stability)
Stylistic Authenticity	Can the audience perceive "this is an authentic expression of this style" (via CVT)?	□1 □2 □3 □4 □5	Stylized short phrase singing training (matching style-specific CVT modes: Edge for Lyric CCM, Overdrive for Pop Rock CCM) + simulated performance
Personal Expression	Can I retain my own vocal characteristics (via CVT adjustments) within the style framework?	□1 □2 □3 □4 □5	Free improvisation exercises (within targeted CVT modes: e.g., Curbing Mode for breathy personalization)

Through this form, teachers can quickly develop training plans based on students' scores and observation results, avoiding teaching deviations such as blind imitation or deviation from the style, and achieving a dynamic balance among "technique-style-personality".

4.3 Innovation, Future Application Value, and Research Limitations of the Framework in This Study

4.3.1 Innovation

It is the first time to systematically integrate CVT mode classification, authenticity theory, and personalized expression research, forming a progressive framework from "technical mastery" to "style analysis" and then to "personalized exploration". Unlike previous studies that only focused on single-dimension research (e.g., merely verifying CVT's physiological validity or discussing stylistic authenticity independently), this framework establishes a clear logical chain.

Specifically, it takes CVT's four vocal modes (Neutral, Curbing, Overdrive, Edge) as the technical core: first, it helps learners master safe and flexible vocal skills (Leppävuori et al., 2021); then, it connects with Moore's (2002) three-dimensional authenticity theory to guide learners in aligning technical application with stylistic norms (e.g., using Curbing mode to meet soul music's demand for breathy timbre authenticity); finally, it combines Noufi et al.'s (2024) vocal persona model to explore personalized expression within stylistic frameworks.

It realizes interdisciplinary integration, drawing on achievements in the fields of emotion recognition (Cañón et al., 2021) to quantify the emotional matching degree of vocal

expressions, sound modelling (Cen et al., 2012) to retain personal timbre characteristics in stylistic performance, and artificial intelligence (Yang, 2022; Qin, 2025) to construct objective evaluation tools for vocal skills. This integration not only fills the gap between technical training and artistic expression in existing pop vocal education research but also expands the research boundary of popular vocal music education from a single technical perspective to a multi-dimensional perspective of "technology-aesthetics-individuality".

4.3.2 Future Application Value

With the help of artificial intelligence and data analysis, objective evaluation of the "technique -emotion" matching degree of learners can be realized. For example, based on Qin's (2025) deep learning data fusion system, real-time collection of vocal parameters (such as vocal fold vibration frequency in CVT modes and formant distribution) and emotional feature data (such as intonation fluctuation and dynamic variation) can be conducted, and through algorithm modelling, the matching degree between technical application and emotional expression can be quantified, providing accurate data support for personalized teaching.

CVT can be combined with personalized recommendation systems (Yang, 2022) and vocal persona models (Noufi et al., 2024): the system can recommend suitable CVT mode training (e.g., recommending Edge mode practice for learners with soprano voices and a tendency for lyrical CCM style) and stylistic learning paths according to learners' vocal type positioning results (from Table 1) and personalized timbre characteristics, formulating dynamic personalized teaching plans that meet the needs of different students.

Virtual reality and digital technologies are increasingly being integrated into vocal music education to enhance teaching effectiveness and expand learning opportunities. Research demonstrates that VR technology creates immersive learning environments where students can simulate vocal performance scenarios, with studies showing significant improvements in pitch accuracy (15% increase) and reduced practice time (20% reduction) (Fan et al., 2025; Yi, 2024). These technologies enable the visualization of abstract acoustic principles and vocal techniques, making complex concepts more accessible to learners (Duan, 2023; Bin, 2024).

Digital platforms facilitate cross-cultural vocal education by breaking geographical limitations and enabling global connectivity (Mi, 2024; Gu & Li, 2020). This technological integration supports comparative learning across different cultural backgrounds, as cross-cultural vocal teaching methods enhance students' expressive abilities in diverse musical styles and promote artistic exchange in globalized contexts (Jing, 2025). The combination of multimedia technology, AI, and VR creates flexible, personalized learning pathways that optimize teaching resources and improve overall educational quality (Hao & Zhang, 2022).

4.3.3 Research Limitations

a) This study mainly relies on literature and case analysis, lacking large-scale quantitative empirical research.
b) The standards of stylistic authenticity may vary significantly in different cultural contexts, and the universality of CVT still needs to be verified through cross-cultural comparative research.
c) The actual effect of personalized teaching needs to be further evaluated through long-term tracking and experimental design.

5. Conclusion

This study not only systematically sorts out the application value of Complete Vocal Technique (CVT) in popular vocal music education but also deeply explores the teaching strategies for it to promote learners' stylistic authenticity and personalized expression. Through literature analysis and theoretical elaboration, it is found that relying on its unique physiological basis and mode classification, CVT not only provides popular vocal music learners with a safe and flexible vocal operation tool (Sadolin, 2012; Leppävuori et al., 2019, 2020, 2021) to meet the diversified needs of popular music but also lays a solid foundation for style shaping and personalized expression at the technical level.

In terms of core value, the core concept of CVT that "all sounds can be produced safely" is highly consistent with the pursuit of vocal diversity and personalization in popular music. The emphasis on vocal diversity and authenticity by CVT also precisely matches the aesthetic pursuit of popular music (Moore, 2002). Its four modes of Neutral, Curbing, Overdrive, and Edge provide learners with a rich "vocal vocabulary", enabling them to flexibly select and combine according to the style and emotional needs of songs. Especially in styles such as R&B/Soul that have high requirements for timbre and emotion, CVT can help singers accurately grasp the essence of the style and demonstrate unique artistic charm.

At the teaching strategy level, CVT provides a systematic path: from building a solid technical foundation, to guiding style analysis and vocal selection, and then to encouraging personalized exploration and emotional integration. At the same time, CVT can also promote personalized expression and teaching innovation by combining with interdisciplinary research results (Cen et al., 2012; Noufi et al., 2024; Qin, 2025), helping teachers accurately grasp the characteristics of learners and promoting the transformation of teaching from standardization to personalization.

In conclusion, CVT is not only a set of technical training systems but also a bridge connecting technology, style, and personalization. It can improve learners' singing skills and artistic creativity and enhance their market competitiveness. In the future, through large-scale empirical research and interdisciplinary integration, its application framework can be further improved to provide more powerful support for cultivating excellent popular singers.

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Conflict of Interest Statement
The authors declare that there is no conflict of interest regarding the publication of this study.

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