FRONTIERS IN MANAGEMENT AND SOCIAL INSIGHTS

(ISSN : 3107-5819) Vol. 2 No. 3 (November 2026)

Research on the Cultivation of Crossover Singing Ability for Music Performance Students in Henan Higher Vocational Colleges

Based on the Overt Differences between Chinese Traditional Singing, Bel Canto and Popular Singing

Su Yan*[1]
Associate Professor Dr. Sanmuga Nathan A/l K Jeganathan[2]

Keywords:

Henan; higher vocational colleges; music performance majors; Chinese traditional singing; bel canto; popular singing; crossover singing

A B S T R A C T

Chinese traditional singing and bel canto are usually treated as one thing when people talk about "the traditional way of singing", but they were built for different rooms. This paper separates the two before comparing either with popular singing. It first sets out six dimensions along which the difference can be seen from outside: resonance cavity, fundamental frequency and range, breath and support, articulation and rhyme, ornamentation, and evaluation criteria. Acoustic and physiological evidence, including the singer's formant, spectral peak level and laryngeal position strategy, is then used to check that framework. The paper goes on to extract trainable technique elements from five Henan genres (Yuju, Quju, Yuediao, Henan Zhuizi and Heluo Dagu), and proposes a three-stage pathway: directional foundation, difference identification, crossover composition. In a one-year teaching experiment the experimental class scored 84.6 at post-test and the control class 75.1 ($t = 4.28$, $p < 0.01$).

1. INTRODUCTION

Henan has 27 extant opera genres and 1,622 opera performance troupes, of which 911 perform Yuju, 440 Quju and 57 Yuediao, according to the provincial government's reply to Recommendation No. 6756 of the 14th National People's Congress. State-owned troupes at provincial, municipal and county level give more than 40,000 grassroots performances a year [1]. Sixty-seven genres have existed or been popular in the province at some point [2], and 125 items from Henan now sit on the national list of representative intangible cultural heritage, including 13 in traditional music, 29 in traditional opera and 5 in quyi [3].

The training side is of a similar scale. Of the province's 174 higher education institutions, 114 are vocational colleges [4], and music performance is one of the arts majors most widely offered there. In 2024 Henan Vocational College of Art ran music performance (vocal and instrumental), quyi performance, modern popular music, opera performance and opera music as separate streams [5]. The Ministry of Education's teaching standard for the major lists vocal performance, instrumental performance, mass cultural activity services and guidance, and arts education and training as its target posts [6].

The difficulty appears where these two sides meet. Troupes, cultural tourism productions, festival events and digital music production seldom ask for one singing method only; vocal courses in most vocational colleges are still organised by method, and a student who has to switch styles ends up copying a timbre. Studies in this area describe styles and judge them aesthetically, and rarely take the difference apart. This paper asks a narrower question: what differences between the singing methods can actually be seen and measured, and how can they be turned into something a teacher can do in class?

2. OVERT DIFFERENCES BETWEEN CHINESE TRADITIONAL SINGING, BEL CANTO AND POPULAR SINGING

2.1 Three singing methods, six observable dimensions

Chinese traditional singing here covers opera, quyi and folk song; bel canto refers to the Western art-school technique taught in conservatories. The two are often lumped together as "traditional singing" because both are old and both are taught as heritage. In practice they differ in almost every observable respect except the requirement of a projected voice, and that difference matters for crossover teaching: a student who has learned bel canto has learned a system of resonance and registration, while

* Management and Science University, Shah Alam, Selangor, Malaysia
Email: 961977247@qq.com

a student who has learned Yuju has learned a system of language and metrical pattern.

Overt differences, in this paper, means differences visible from outside, describable in words and to some degree measurable, as against impressions that can only be felt. A difference that can only be felt cannot be taught. The student leaves the lesson still not knowing which muscle to move.

Table 1: Overt differences among Chinese traditional singing, bel canto and popular singing across six dimensions

Dimension	**Chinese traditional singing (opera, quyi, folk song)**	**Bel canto**	**Popular singing**	**Observable in class**
Resonance cavity	Oral and oropharyngeal resonance, with the larynx moving up and down with pitch	Low larynx, long and widened pharynx, sound placed in the mask	Oral resonance as the base, supplemented by microphone and amplification	Front or back placement; laryngeal height
Fundamental frequency and range	Working range of about one and a half octaves; some styles favour the upper register	Working range of about two octaves, smooth through the register break	Working range of about one and a half to two octaves, often narrow in beginners	Where the register break sits; how it is crossed
Breath and support	Dantian breath; breath points fixed by the metrical pattern (banshi)	Diaphragmatic support, steady subglottal pressure across the phrase	Abdominal support as a precondition; continuous flow with fine dynamic control	Placement of breath points; stability of pressure
Articulation and rhyme	Melody follows the word; initial, final and ending of each syllable fully sounded	Word and tone reconciled, vowels unified for legato	Colloquial articulation; vowels modified to even out the timbre	Clarity of articulation; completeness of syllable endings
Ornamentation and vocal colouring	Formulaic; vibrato, portamento and souyin have fixed uses	Vibrato as a continuous element of the tone, not an addition	Personal; breathiness and crying tone used freely	Type and density of ornaments
Evaluation criteria	Fidelity to the school; transmission comes first	Evenness, legato and projection come first	Recognisability and appeal; individual expression comes first	Vocabulary of evaluation and frame of reference

2.2 Acoustic and physiological evidence

Yu Shanying and colleagues measured the voice spectra of accomplished Yueju and bel canto singers with a Brüel & Kjær 2260 system and a B&K 3560C Pulse multi-analysis system. The singer's formant appears in Yueju voices too, mostly between 2600 and 2800 Hz, with an overall spectral peak near 80 dB; in bel canto it clusters between 2800 and 3200 Hz, with a peak near 87 dB [7]. The same author reports that the formant's appearance is tied to narrowing of the laryngeal vestibule, that is, to a particular laryngeal adjustment [8].

Table 2 Acoustic and physiological parameters of the three singing methods compared

Parameter	**Chinese traditional singing**	**Bel canto**	**Popular singing**	**Source**
Singer's formant	2600–2800 Hz in accomplished Yueju singers	2800–3200 Hz	No stable high-frequency band in general	[7]
Spectral peak	About 80 dB (Yueju)	About 87 dB	No comparable stable high-frequency peak	[7]
Laryngeal adjustment	Tied to narrowing of the laryngeal vestibule	Low larynx with a widened pharynx, adjusted as a whole	Mainly direct control of vocal fold function	[8]
Vowel treatment	Melody follows the word; /a/ may shift towards /o/ across the break	Vowel modified for a unified timbre throughout the range	Vowel modified to fit register and microphone	[9]

Figure 1: *Frequency ranges and spectral peak levels of the singer's formant in Chinese traditional singing (Yueju) and bel canto*

These settings make sense once the performance space is taken into account. Opera and quyi were performed on temple stages, in open squares and at village entrances, where the voice had to cut through ambient noise before anyone could judge whether it was beautiful, so a band of high-frequency energy was not optional. Bel canto grew up in halls built for it, and still

relies on an unamplified voice filling a large room, which is why the formant is even stronger there. Popular singing works with a microphone: the voice goes straight to the listener's ear, does not have to cross space, and low and middle frequencies in fact sound closer and more intimate. The differences come from conditions of transmission, not from a ranking of technique. This is the easiest point to get across in class, and students accept it readily, since it removes the implication that one method is more advanced than another.

The figures in Table 2 come from samples taken on particular voice parts and vowels, and those conditions are not fully matched across studies, so comparison between them indicates a trend rather than a precise gap. The trend is clear enough: Chinese traditional singing and bel canto both push energy into a higher frequency range for penetration, bel canto further than traditional singing, while popular singing keeps energy low and middle for closeness. Studies by Liu Wen's team at Shandong University reach a similar conclusion from the angle of source–filter coordination. National singing adjusts compensatorily upward at the register break; bel canto engages earlier and spreads the adjustment more evenly. The former realises melody through words, the latter words through melody [9].

3. REGIONAL FEATURES OF MUSIC PERFORMANCE IN HENAN AND THEIR CROSSOVER RESOURCES

3.1 Vocal Technique Elements in Local Opera and Quyi

Table 3 draws trainable technique elements out of five genres. All five appear on the national list of representative intangible cultural heritage items and are widely practised across the Central Plains [3].

Table 3 Vocal technique elements extracted from local opera and quyi genres in Henan

Genre	Category	Vocal style and language	Trainable technique elements
Yuju	Traditional opera	Zhongzhou phonology; Xiangfu, Yudong, Yuxi and Shahe styles	Passing between falsetto and chest voice in the upper range of the Yudong style; timbral control of the chest voice in the Yuxi style; aligning metrical pattern with breath points
Quju	Traditional opera	Zhongzhou phonology; tune-title (qupai) form	Bright timbre built on the natural voice; moving from one tune title into the next
Yuediao	Traditional opera	Zhongzhou phonology; archaic and vigorous	Sustaining a vigorous timbre; layering of tone in narrative passages
Henan Zhuizi	Quyi	Zhongzhou phonology; zhuihu accompaniment	Prosody where speech and song meet; interlocking with the accompaniment and leaving space for it
Heluo Dagu	Quyi	Luoyang dialect; drum clapper and sanxian	Narrative speech rhythm; matching dialect tone to melodic contour

3.2 Turning regional resources into teaching resources

Three conversions do most of the work here. An aria becomes a technique sample: one passage is lifted out of a full play so that it can be practised on its own, for instance the register transition in the upper range of the Yudong style, the interlock of zhuihu and voice in Henan Zhuizi, or the narrative rhythm of Heluo Dagu. Style becomes comparative material: the same lyric sung in several genres lets students hear how dialect, role type and metrical pattern change the way a line is sung. A regional work becomes raw material for composition, with students making a popular arrangement that still respects the original tune.

4. CONSTRAINTS IMPOSED BY THE CHARACTER OF VOCATIONAL ARTS TEACHING

Any pathway has to fit the conditions vocational colleges actually work under. The Ministry of Education's Teaching Standard for the Music Performance Major (Higher Vocational Education, Junior College Level) sets requirements for institutional conditions and for the distribution of teaching hours, and these bound the design [6].

Total hours are limited, so new content has to be fitted inside existing courses rather than added on top. Practice-based teaching takes more than half the hours, which means crossover competence has to be assessed in real tasks. The internship runs six months, with students placed in troupes, cultural centres, training institutions or cultural tourism productions, so the curriculum has to connect with those settings.

Student intake adds a further constraint. Students come in through the provincial arts examination with very uneven specialist preparation. Some have had traditional singing through the general courses brought into schools under the "opera on campus" programme; others have taught themselves popular singing on online platforms. Their general academic grounding is

comparatively weak and abstract theory does not travel far with them; they learn faster when they can hear, see and handle the thing itself. That is one reason this paper begins from overt differences rather than from aesthetics.

5. TEACHING PRACTICE AND EVALUATION OF EFFECTS

5.1. Survey design and main findings

Music performance students at three vocational colleges in Henan were surveyed to establish where they start from and what they need. Of 230 questionnaires, 204 came back valid. The questionnaire had four sections: understanding, self-rated competence, course needs and career intention.

The results point to an imbalance in two directions. In the understanding section, 61.3% agreed that the singing methods differ only in style and use the same technique, which suggests the underlying differences are not being explained in teaching. Only 28.4% could say that the resonance cavity is placed differently, and 19.6% that the articulation rules differ. Self-ratings were reasonable for work inside one method: 3.62 for traditional singing and 3.41 for popular singing on a five-point scale. The two items that involve switching dropped sharply, to 2.28 for adjusting articulation when changing style and 2.15 for cross-style sight-reading and improvisation. On course needs, popular singing technique was chosen by 78.9%, opera and quyi singing by 66.2% and cross-style arrangement by 59.8%. Arts training institutions accounted for 41.2% of career intentions, performing troupes and cultural tourism performance together for 33.8%. The pattern is consistent: the more a task resembles training they have already had, the higher they rate themselves; the more it crosses a line, the lower.

5.2. Design of the teaching experiment

The experiment ran in two parallel classes of the 2023 cohort in one vocational college, 32 students in the experimental class and 31 in the control class. The classes did not differ significantly in entrance specialist scores, gender or intake category. Over one academic year the experimental class followed the three-stage pathway in its vocal courses; the control class continued with the existing single-track courses. Assessment used a 100-point scale across four indicators: technical completeness, stylistic identification, articulation and language handling, and stage presentation. Three vocal teachers of associate senior rank or above rated independently and blind, and the scores were averaged. The set repertoire required the same lyric to be sung once in Yuju style and once in popular style, so that switching could be judged directly.

5.3. Results and limits

The post-test means were 84.6 for the experimental class and 75.1 for the control class ($t = 4.28$, $p < 0.01$). The gap is largest on stylistic identification, which is what the pathway was designed to address; the smallest gap is on technical completeness, where the control class's single-track training holds up.

Three cautions apply. The sample is two classes in one institution, so the conclusion needs replication elsewhere. The assessment includes a subjective listening component; blind rating and averaging reduce bias but cannot remove raters' style preferences. And one year allows a single pass through the pathway, while the cultural understanding that crossover singing depends on takes longer to show and does not register in a short-cycle test.

6. CONCLUSION

The differences among Chinese traditional singing, bel canto and popular singing can be stated rather than merely felt. The six-dimension framework turns them into items that can be observed and described, and the acoustic parameters (singer's formant, spectral peak level, laryngeal strategy) give that framework independent support. What separates them is the condition of transmission, not a hierarchy of technique. Once students see this, the resistance to learning the other method drops: the question changes from "which is better" to "which room am I singing in".

For vocational colleges in Henan the practical consequence is that local opera and quyi need not be taught as heritage appreciation alone. Extracted as technique samples, they supply exactly the material a crossover curriculum lacks.

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