New methods of composing choral works for pre- and post-menarcheal female voices of varying linguistic diversity in the Northern Territory

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Abstract

Composing Territory is a research project with two main aims. The first aim is to identify optimal composition and arrangement techniques for choral works written for female singers from various linguistic backgrounds in the Northern Territory whose voices are undergoing pubertal changes. The second aim is the creation of twelve choral compositions plus an accompanying teaching resource, to provide sequential delivery appropriate to the educational context of the region, wherein the majority of choral educators have no music training.

The diverse and transient nature of the Northern Territory's population and the lack of education training and resources for choral delivery make traditional choral works inaccessible and tonal homogeneity of choirs unlikely. By changing the way we compose choral works it may be possible to ensure student learning continues through the period of female vocal change, achieve more homogenous sounds from linguistically diverse choristers, and successfully establish choral blend.

Underpinning the compositional process with pedagogical considerations of linguistic differences and pubertal changes delivered through appropriate teaching strategies and resources will be significant outcomes of this projects. These outcomes could ensure non-music specialists are better equipped for choral delivery and student learning continues throughout voice change processes unhindered by individual linguistic background.

Key words: Female vocal change

Composing Territory is a PhD research project that aims to identify new methods of composition for choral works written for female singers in the Northern Territory who come from diverse linguistic backgrounds and whose voices are transitioning through puberty, and to create pedagogical resources to facilitate the process of choral delivery for untrained music teachers.

Currently, choral works are arranged for traditional voice types based on range — Soprano, Alto, Tenor, Bass and Treble — despite research finding that voices in transition do not match the relevant pitch ranges and capabilities designated to these voice types (Gackle, 1991). Compositions written specifically for middle school age students aged twelve to fifteen are written to a set of arbitrary musicianship skills that it is assumed a student aged twelve to fifteen would have attained in prior music studies. These works neither address nor accommodate female voice change in puberty.

The lyrics in current compositions are often borrowed from classical or religious texts, assuming a base knowledge of a common tongue and fundamental intrinsic aural skills that enable the student to perform basic vowel modification for the purpose of tonal homogeneity in group singing. These works assume that students who speak the same language will have uniformity of pronunciation, but in multi-cultural regions such as the Northern Territory, where various dialects

from each of the three major forms of Australian English — Standard Australian English, Aboriginal English and Ethno-Cultural Australian English — are prevalent, traditional vowel pronunciation is rare and tonal homogeneity unlikely.

Through eleven years of choral teaching in the Northern Territory (NT) I have found the following to be true:

- Our teachers and students are unaware that adolescent female voices go through a six-year period of voice change.
- Our choristers are intensely affected by their use of various dialects of Australian English.

None of the repertoire used by NT choirs is written or arranged with either of these issues as a consideration.

Our choirs are taught primarily by teachers with no music training, lacking the skills to move choristers beyond basic two-part echo singing.

In the Northern Territory singing is not a compulsory activity in early or primary years of schooling. Approximately one thousand students annually participate in their first formal voice training in grades five and six as participants in the Beat Festival, a multi-arts extravaganza coordinated by the Northern Territory Music School for which choral students learn twelve songs whose selection is based on perceived audience enjoyment rather than skill development. This repertoire does not provide scaffolding for student learning, nor does it prepare or allow for voice change processes or tonal difficulties arising from student linguistic background. In 2016 the *Beat Program* was extended into middle and high schools but no changes were made from the primary schools' program to assist with continued musicianship and skill development through puberty into the senior years.

Composing Territory evolved from the need to discover new methods of composing choral works to address complications arising from female voice change, to improve tonal irregularities resulting from linguistic diversity, and to make new works readily accessible to non-music specialists within the constraints of the Australian Curriculum.

This project has three aims:

- To establish a set of compositional guidelines for choral works written specifically for pre and post menarcheal female voices of varying linguistic diversity in the NT.
- Incorporating these guidelines, to compose twelve songs and associated teaching resources for use by Territory choral educators.
- To evaluate the effectiveness of the compositions and accompanying resources from an educational perspective.

This paper focuses on the first of these aims.

Literature Review

The largest body of work pertaining to female voice change has been produced by Lynne Gackle. Through a series of longitudinal studies with choristers aged eight to sixteen her research established that girls experience four distinct stages of voice change, characterised by:

- lowering of average speaking pitch area (mean speaking fundamental frequency)
- voice cracking and abrupt register breaks (abrupt voice quality changes)
- increased breathiness, huskiness, or hoarseness in voice quality
- decreased and inconsistent range capabilities (tessitura —the range in which a vocal part comfortably sits— tends to fluctuate)
- uncomfortable singing or effortful and delayed phonation onset
- heavy, breathy, rough tone production and/or colourless, breathy, thin quality
- insecurity of pitch intonation (Gackle, 1991).

Research into the process of female voice change has found the onset of menarche has the most salient effect on voice change, resulting in significant loss of control of laryngeal mechanisms (Duffy, 1970). The onset of menarche is indicative of the most significant period of laryngeal growth and generally coincides with a period of physical growth. Willis and Kenny (2011) found weight can be an indicator of vocal stages of development as changes in fundamental speaking frequency

have proven synonymous with certain weight ranges. While student self-assessment would be the ideal method of ascertaining vocal stage of development, knowledge of weight ranges and their corresponding stage of voice change could assist teachers struggling to identify a student's vocal stage for appropriate part distribution.

While voice change occurs at the onset of puberty in both sexes, laryngeal growth differs. Male laryngeal growth is primarily posterior-anterior (lengthwise) while female laryngeal growth is primarily superior (height-wise) (Kahane, 1982). Superior growth results in an extended period of huskiness in female voices—up to five years, compared with the relatively short six to eighteen months experienced by male choristers. If not addressed, girls' increased period of laryngeal tension can result in significant vocal disability (Smith-Vaughan, Hooper & Hodges, 2013).

It is essential that voice change be considered by both composers and choral practitioners to ensure that vocal health of choristers is preserved.

Compounding the difficulties facing pubertal choirs in the NT are the varied backgrounds of our students within each ensemble. Three major categories of Australian English are currently recognised linguistically; Standard Australian English, varieties of Aboriginal English, and various Ethno-cultural Australian English dialects (Cox, 2006). Each of these utilises different phonetic characteristics of vowels, reduction processes, and allophonic and suprasegmental stresses[1] (Cox & Palethorpe, 2007). Tonal homogeneity is desired in choral settings (Elkholm, 2000) but the wide variety of Australian English forms makes this challenging, if not impossible.

In traditional choral settings Latin vowel pronunciation is preferred. This should be achievable for speakers of Standard Australian English, as it shares its phonemic inventory[2] with Southern British English (Cox, 2006). However, due to exposure to a myriad of English forms and second languages and a late start in choral learning, NT students often lack the auditory skills to recognise tonal differences.

Aboriginal English rarely raises the palate, and incorporates the tonal system of Indigenous languages (Arthur, 1996). The majority of Ethno-cultural English varieties in the NT originate from Asia, meaning their root language is not Latin-based. In many South-East Asian dialects, the vowels have a two or three-level vowel length system (Remijsen & Gilley, 2008), opposite to the shortened system of vowels common to Standard Australian English, where vowel duration is shortened by up to 60% (Cox & Palethorpe, 2007).

It is possible to standardise vowel placement in a lower palate position than that allowed by Latin vowels, allowing easier vocalisation particularly for Indigenous choristers. By shifting vowel movement primarily to the lower palate position, it is possible to establish homogenous sound, though it still lacks the tonal quality desired in traditional choirs (Kob, Henrich, Herzel, Howard, Tokuda & Wolfe, 2011). Vowel reduction is common in NT dialects, and can be avoided if the composer dictates prosodic and lexical stress[3] in the score.

Voice change has been proven to have a negative impact on student psychological well-being. Studies have found positive development in adolescent schooling is dependent on goal-directed learning, intense and focused concentration and intrinsic motivation (Hektner, 2001), a similar result to the findings of flow theory wherein successful student engagement is attributed to concentration, interest and enjoyment (Shernoff, Csikszentmihalyi, Shneider & Shernoff, 2003). Unfortunately, the process of voice change results in loss of student interest, a feeling of inability, loss of achievement, a reduction in concentration and motivation shift to other activities (Freer, 2015).

1 Suprasegmental stresses are speech features such as stress, intonation or word juncture that accompany or are added over consonants or vowels.

2 The set of speech sounds distinctive to a language.

3 English is a lexical stress language, meaning in any word with more than one syllable, the syllables will differ in their relative salience.

Phenomenological studies by Freer (2015) and Sweet (2015) suggest experiences of voice change are both emotionally and physically negative, regardless of gender. Both studies revealed pubertal changes resulted in gender-based bullying and reduction in students' sense of self-worth. The sudden inability to perform to the musicianship standard achievable pre-puberty resulted in loss of self-belief and students quit choir permanently to avoid social censure. Choral learning has lifelong health benefits to social, physical and mental wellbeing (Clift, Hancox, Morrison, Hess, Kreutz, & Stewart, 2010). It is essential that educators find ways to ensure that students remain engaged in choral learning, and that students' unique needs are met though the period of vocal change. By composing choral works that allow students to continue to perform at their pre-pubertal musicianship standard without compromising vocal health it is hoped students will maintain their sense of self-worth and social gratification in choir.

In recent years limited attempts have been made to address the compositional and pedagogical considerations necessary for voices in transition. Most notable of these is the Australian series *ChoralTime!* by George Torbay (2008). The series distributes songs according to the level of musicianship a chorister should achieve by a particular age, if choral learning begins in the early years of schooling. The books are distributed by school grade, Book 1 being for grades 1-2, Book 2 for grades 3-4 and Book 3 for grades 5-6. Each piece has a set of notes for conductors and scores are free to photocopy from the book for schools, optimising access. However, this would mean an NT choir, with a starting age of grades 5-6 should utilise book 1, which contains only simple unison songs appropriate for children aged seven to eight. The books do not accommodate vocal change processes, nor the complications arising from varied linguistic backgrounds and consequent lack of tonal homogeneity. Conductor's notes are limited and not easily understood by an individual with no music training.

A similar set of works was commissioned by Lynne Gackle in response to her research into female voice change; the *Lynne Gackle Choral Series* (1996). However, these works do not adhere to the guidelines of her work; parts extend far beyond the tessitura of each stage of voice change and the text is often heavy, borrowed from poetic works. Linguistic diversity is not a consideration found in these works.

Methodology and Methods

Composing Territory is a practice-led multi-modal project within the Interpretivist paradigm, comprised of a teaching resource of new choral compositions and accompanying teaching notes, and exegesis. Underpinning the research is the understanding that each chorister and conductor will experience the teaching and learning of a composition uniquely, and that each of these experiences is equally valid.

Twelve choral works and accompanying teaching resources are being created for Composing Territory and are then being trialed in a case study by current choral conductors of varying experience with choirs of varying age and ability to determine:

- the effectiveness of the choral works on continued skill development in students from diverse linguistic backgrounds experiencing vocal change
- the accessibility of the resource for teachers both trained and untrained in the Northern Territory context.

The project is currently in the first of three rounds of action research in which choirs can choose to participate. There are ten educators currently working in NT schools with students of appropriate age. Each participating educator will complete an interview and rehearsal observation at the beginning and end of each action research cycle, and one exit interview when they complete their participation in the research.

To determine the impact of the resource on student outcomes the NT Music School's advanced vocal ensemble, *Pure Note,* will complete full

spectrum and time resolution analysis of the vocal progress over a two-year period working with the resource using *VoceVista* computer software. An electronic record is being created for each member of the ensemble to profile changes in the voice through puberty, and changes to articulation and tonal quality.

Data will be separated into three themes: Knowledge, Practice and Musicianship. Division of data into these three areas will allow for trends in student outcomes across schools and regions to become apparent, identifying whether poor student performance and outcomes in choir are a result of repertoire, delivery or musicianship. By identifying the cause of poor performance in choir, composers can be better informed regarding considerations necessary to facilitate the process of choral education.

Given the diverse ethnic background of NT students and the transient nature of the population, it is unlikely a choir will be able to achieve traditional tonal homogeneity, or that students' progress in musicianship skill without resources that accommodate voice change processes and student linguistic differences. By creating choral works that distribute parts according to stage of vocal development, with text that accommodates linguistic diversity by appealing to common syntaxes between local language groups it is hoped students might better engage with new choral material and progress effectively in the middle years of their choral education.

Composition process

In the time-poor environment in which modern classroom teachers function, cross-curricular resources are desirable. In the Australian Curriculum, a unit of work concentrating on 'People and Places' is common across all curriculum areas, including music. Subsequently, twelve people and/or events from Northern Territory history have been selected as themes for each of the twelve choral compositions being composed for *Composing Territory*. The first of these is '*Ocean of Sand*', an emotive piece about the Afghan Cameleers. Excerpts from this piece will be used below to demonstrate how each of the guidelines for the composition process has been utilised.

Instead of traditional voice types, vocal parts in *Composing Territory* have been distributed according to stage of voice change — Stage 1, Stage 2a, Stage 2b and Stage 3 — with constraints as follows:

Stage 1: Age 12 and under / Voices not yet undergoing change

Vocal range at this age is Bb3-F5 with a tessitura of D4-D5 (Figure 1). Tonal quality is light and flute-like, suitable for flexible, intervallic movement. Treble voices are capable of limited dynamic variation compared with mature voices and this should be considered when distributing melodic or harmonic roles across the choir to ensure the melody is always present. There are no register breaks at this age and students should have adequate breath control; however, student physical size should remain a consideration for both dynamic and tonal purposes.

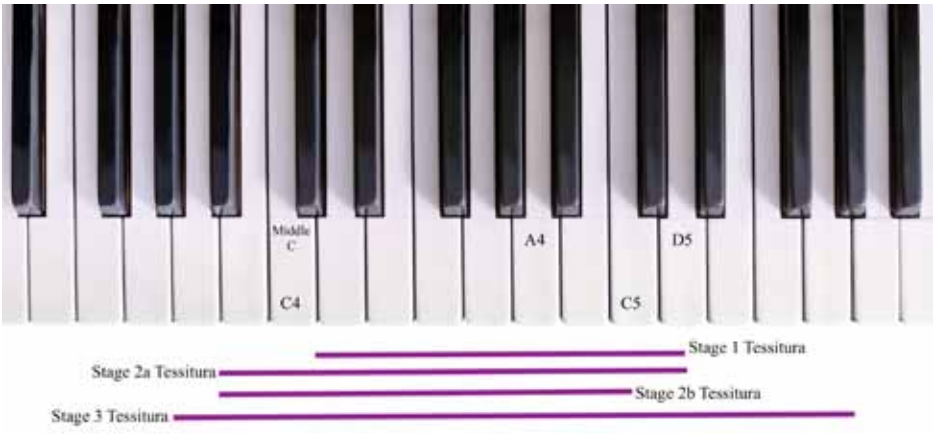
In *Ocean of Sand* (Figure 2) the range has been kept within the given tessitura, except the tonic note, which is doubled by the Stage 3 singers when necessary to ensure clarity and dynamic. This part carries the main melodic motif, as it is best suited to large intervallic movement and has no register breaks to interrupt the melodic line or alter tonal quality in the upper register. As dynamic variation in this part is limited it is kept within mp-mf range.

Stage 2a: Age 13 / Voices undergoing change prior to first menarche

Vocal range at this age has lowered to A3-F3 (Figure 1) with a tessitura of D4-D5 but students are capable of singing in Mechanism 1[4] to Bb3 with reduced control of the vocal mechanism.

4 Vocal Mechanisms M0, M1, M2 and M3 are Laryngeal Vibratory Mechanisms which describe different configurations that the vocal cords.

Figure 1: Tessitura for the vocal stages and register breaks



Movement and/or phrasing over the voice break at A4 should be avoided and the voice is best suited for softer, harmonic roles with limited intervallic movement due to breathiness in tone resulting from reduced laryngeal control. Ample breathing time and opportunity is needed, and limited dynamics are achievable.

In *Ocean of Sand* (Figure 3) these limitations are marked by reducing the pitch range to sit comfortably within the tessitura and limiting movement over the voice break to the start of phrases. Similarly, the line moves primarily in steps with intervallic movement occurring only at the beginning of phrases, or where a new breath is permitted. For the purposes of musicianship development, stage 2a is given more challenging harmonic material, following harmonic lines along the fourth and fifth intervals.

Stage 2b: Age 14 / Voices undergoing change post first menarche

Vocal range remains the same as stage 2a but with a lower tessitura of B3-C5 (Figure 1) with two

Figure 2: Ocean of Sand score Stage 1 extract, Section B

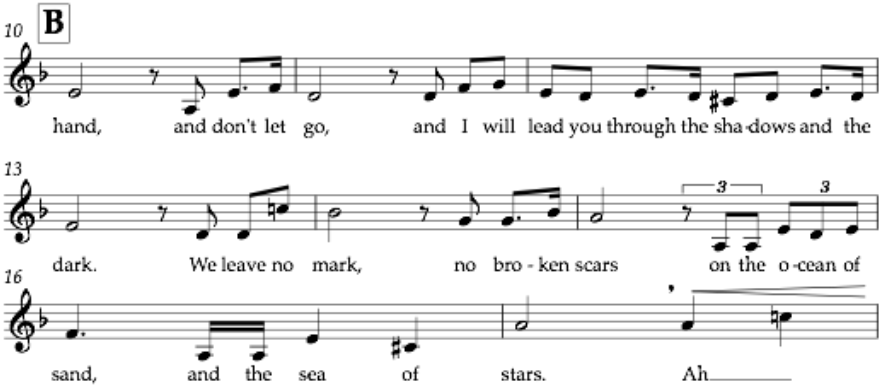
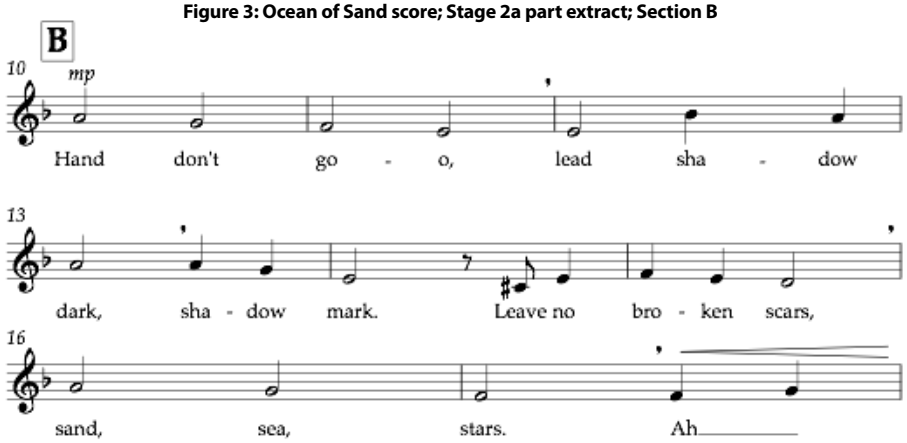


Figure 3: Ocean of Sand score; Stage 2a part extract; Section B



register breaks at B4 and D5. Movement above A4 is husky and uncomfortable, best suited to lower harmonic parts, particularly drones and ostinati requiring darker tonal quality. Voice cracking on long held notes is likely and the tone may be marked by a hoarse quality. Rest and the use of Mechanism 2 should be prescribed where possible. In *Ocean of Sand* (Figure 4) the range for Stage 2b has been limited to notes below the first break point so students can remain in the mechanism 1 vocal register below the first break point. Movement below C4 has also been limited to ensure vocal strain in this register is kept to a minimum and hoarse vocal quality can be avoided with good vocal health and care. Movement in this section is primarily by step with no fast movement - the part utilises primarily crotchet and minim note values. Breathing is clearly marked in the score, and ample breaths provided; students are rarely required to sustain a breath for longer than two bars.

Stage 3: Age 15 and above / Voices finished vocal change, maturing into adult voices

Figure 4: Ocean of Sand score; Stage 2b part; Section B

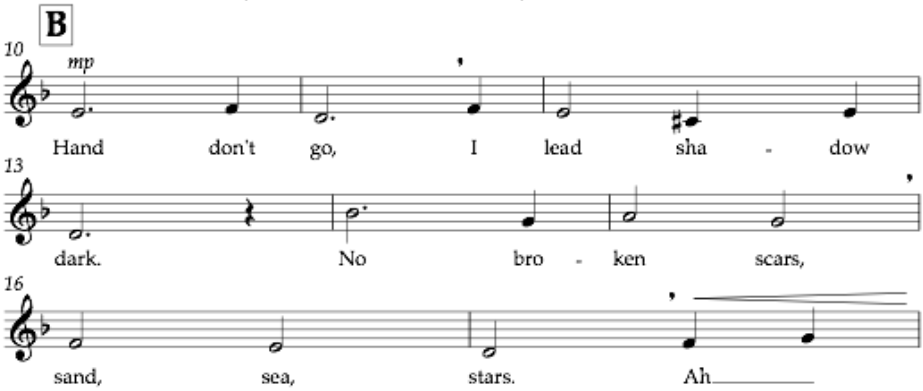
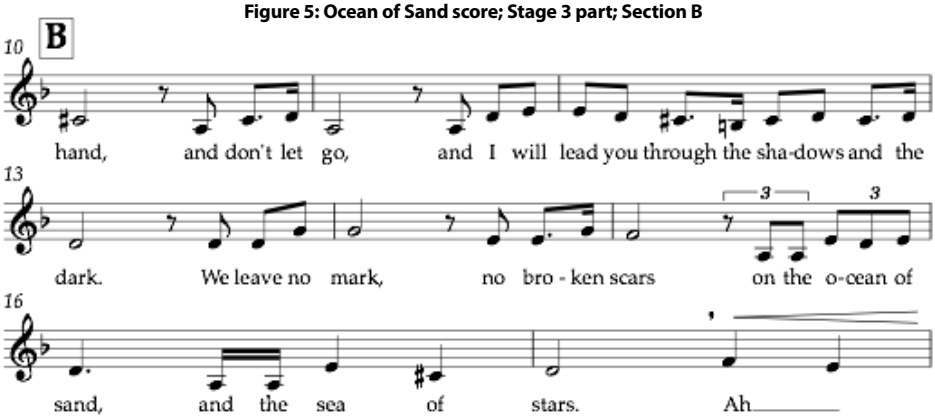


Figure 5: Ocean of Sand score; Stage 3 part; Section B



Vocal range at this age is settling into an adult range of A3-A5 (Figure 1) with a tessitura of A3-G5. Stage 3 voices have more depth than treble voices, though lighter than an adult female. Vibrato will appear and may be uncontrolled—if undesired vowel sounds and note lengths likely to induce production should be avoided. A register break still exists in the second passage around D5 and students will struggle to move through this without vowel modification. The voice regains strength, agility and dynamic variance at this age, suitable for any role within the choir.

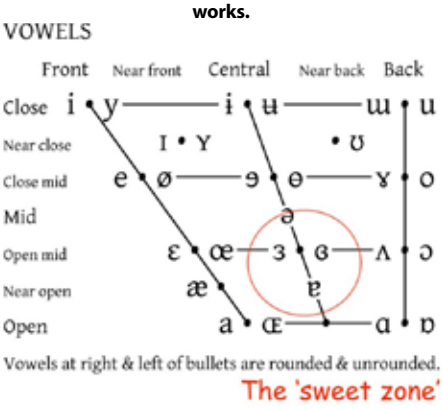
In *Ocean of Sand* (Figure 5) the range is expanded into the lower end of the tessitura but does not move over the register break to ensure comfortable singing and allow for depth characteristics of the voice to colour the music. Students are given challenging harmonic roles that move with the melody but shift around the tonic and second and minor third intervals. A wider dynamic range is required in this part and intervallic movement is increased back to that required in Stage 1.

For the choir as a whole, new concepts are being introduced to ensure musicianship growth continues. For the NT, it is assumed the majority of choristers in middle school will have participated in two years of voice training as participants of a choir in primary school and choristers will subsequently have vocal skills to approximately a Grade 1 Australian Music Education Board (AMEB) level and therefore be focusing on acquiring skills appropriate to grades 2-4 in their middle school chorister years. In the case of *Ocean of Sand* the following musicianship aspects are focused on harmonic minor scale, triplets, dotted notes, crescendo, decrescendo and ritardando.

Linguistic Considerations

Phonetic considerations are necessary to accommodate the wide variety of linguistic backgrounds of NT choristers. As a result,

Figure 6: Vowels within or closest to the 'sweet zone' ideal for use in Composing Territory choral works.



traditional vowel pronunciation in the choral works should be limited and text carefully considered. When establishing vowel lengths and articulation two syllable words have the most commonality across dialects prevalent in the NT. Similarly, harder vowel sounds originating toward the middle and back of the hard palate are preferred, particularly those common in South East Asian and Indigenous Australian languages. Therefore, selection of vowels with a lowered palate and primarily latitudinal setting are desirable.

Pronunciation of vowels is determined by how open or closed the mouth is. Tongue constriction further affects vowel sound. Australian habit closes the mouth and constricts the tongue, creating a nasal tone.

Consonants are the articulatory devices of words; the size of movement and the duration and frequency of each consonant applied to a vowel determines accent. Suprasegmental features of words are those outside its consonantal components, such as stress and intonation. These stresses must be clearly marked in the phrasing and text of the score.

Plosive[5] sounds should be avoided, or be consistent if used. For example the plosive 'p' is often over-emphasised in Ethnocultural Australian English forms and if used should be explicitly demonstrated by the conductor to ensure uniformity among the choral group. This same rule applies for all sounds where turbulence is created outside the main vocal mechanisms using the teeth and lips, such as 'f', 'p', 't', etc.

Reading grade is a consideration due to the high percentage of students speaking English as a second language. Text selection should be simple enough for students with poor literacy skills to read, complex enough for capable students to engage with the story, and contain words easy for the conductor to dictate word stress.

In *Composing Territory* each piece of music focuses on teaching a set of vowel sounds from the International Phonetic Alphabet and provides audio aids and exercises to assist in the learning of these sounds. The goal of learning the exercises is not to obtain traditional vowel pronunciation but instead to establish choral blend within the group. The exact homogenous sound of each group will differ depending on the linguistic backgrounds of its students. By learning a specific set of tones as a group, new tonal presets can be established and tonal homogeneity achieved.

For *Ocean of Sand* the following sounds from the International Phonetic Alphabet are focused on; [ɐə]| as in sand, [iː] as in sea, and [□ː] as in stars. *Ocean of Sand* is written to assist students in learning to shift the 'a' vowel across the palate in its various pronunciation forms by shifting the middle of the tongue's position in the mouth, and by reducing or expanding the oral cavity.

Pedagogical considerations for choral composing and arranging

There are basic assumptions made when composing choral works, such as the conductor will have at least rudimentary sight reading and aural skills, adequate to interpret and impart the various instructions of a music score. However, this assumption does not reflect the reality of modern classroom music education, particularly in the Northern Territory. Of the thirty-three choirs participating in the *Beat Festival* in 2018 fourteen are led by music trained specialists, leaving nineteen with no formal music training. While all classroom music teachers in middle schools are music trained specialists, only two are voice specialists (indicating either that voice is their primary instrument or they are trained choral specialists). Of the classroom music teachers in middle schools, only those who identify as voice specialists currently run the choir in their school. Despite all middle schools in the NT having a music specialist tasked with delivering classroom music, this is often not the individual in charge of choral education for the school. Often a non-music trained individual with no previous

5 A consonant that is produced by stopping the airflow with the lips, teeth or palate. The plosives in English language are t, k, and p (voiceless) and d, g, and b (voiced).

experience is tasked with running the choir, indicating an endemic belief that choir is separate from music, and does not require the same level of music knowledge and musicianship. Rather, school administrations appear to believe all that is required to teach choir is a general enjoyment of singing.

Few choral resources are designed with the understanding that the educator cannot at least read the given score. Resources that do accommodate this situation rely on audio recordings for either the educator, the student or both to learn from. However, these recordings rarely reflect the group they are designed to assist as recordings are performed by either professional adult singers singing in an adult style and range, by adult SATB choirs, or in a pop music style (such as the Sing and Jam school singing texts, in which the singing does not accurately match the score provided). Such resources are not accurate reflections of what teachers can expect from their choirs.

When composing choral works for voices in transition in the NT it is vital to consider who will be teaching these works, and to provide adequate scaffolding and resources for successful teaching to occur. These resources should include accurate recordings, sung in a style that reflects the abilities and tonal resonance likely to be achieved by students of this age and skill. Along with the recordings, instructions on how someone with no experience could teach each composition with step-by-step instructions and advice on which skills to focus on is advisable. Similarly, associated warmups and skill development activities are needed.

Music is currently only one subject listed within the Arts umbrella of the Australian Curriculum. As a result, music education time is shared with four other subject areas, leaving little time to provide a thorough understanding of music. Choir offers an opportunity to teach music en-masse, with no instrument costs, and is attractive to schools for its flexibility as an extra-curricular activity. Cross-curricula priorities in the arts curriculum include Aboriginal and Torres Strait Islander Histories and Cultures, and Asia and Australia's Engagement with Asia. A general capability of the curriculum is Intercultural understanding. Each of the pieces in *Composing Territory* tells the story of a people or event in the NT's history, such as the Afghan Cameleers or the sinking of the ship *Ellengowan*. Through the exploration of people and places, choral pieces can meet not only the general capabilities requirements of the curriculum but also provide rich cross-curricular opportunities.

Evidence of Impact on Tonal Homogeneity and Choral Pedagogy

Observations of choral rehearsals run by educators teaching the choral works in *Composing Territory* and a previous pilot study conducted by Sealey reveal changes to rehearsal time allocation from the majority of the teaching concerning pitch material to focusing on dynamics and tone colour, and improvement in overall group tonal homogeneity. Spectrograph recordings from current choristers show vowel tones have been matched within six months of working with the compositions, while students who have not been working with the choral works are yet to find homogeneity with the group.

Figure 7 shows three vowel charts from spectrograph recordings of the vowel [a:]. Students A and B each participated in the pilot study and have matched the tone in the first harmonic formant within 30Hz of one another. However, Student 3 is new to the ensemble, has not participated in rehearsing the choral works and has not achieved tonal homogeneity; the vowel in the first harmonic formant[6] sitting almost 100Hz from the closest tonal match within the ensemble. The [a:] shown on the chart is positioned to the traditional Latin setting. Student A is from an Indonesian background and generally speaks with

6 A formant is a concentration of acoustic energy around a particular frequency in the speech wave.

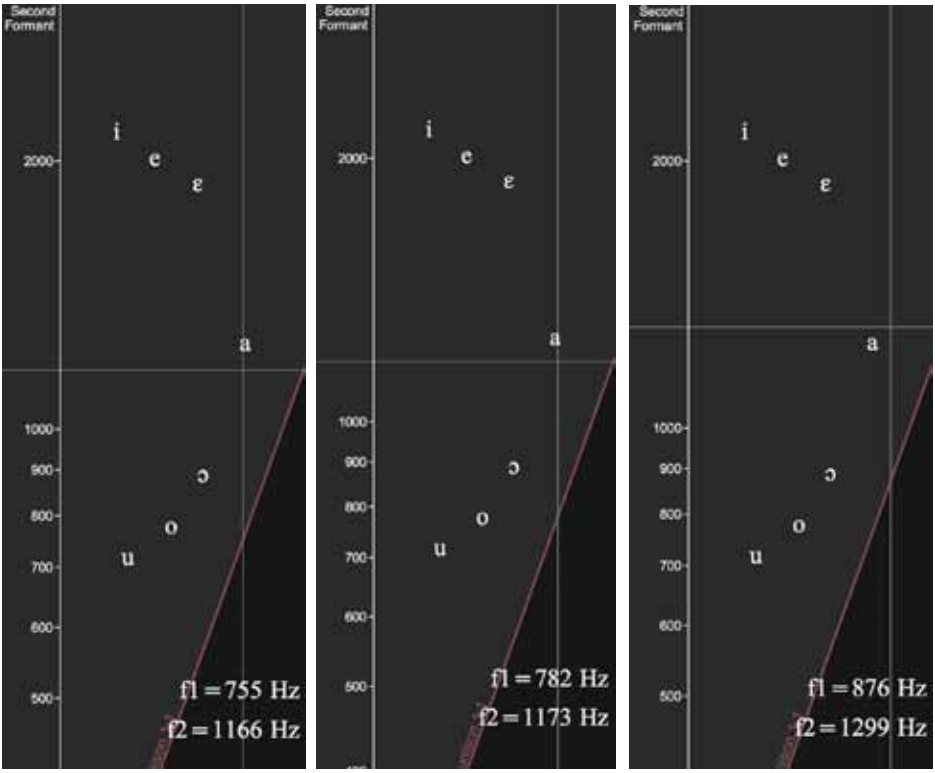
an Ethno-Cultural Australian accent, while students B and C are caucasian Australian and generally speak with a Standard Australian accent.

Conclusion

Traditionally choral arrangements are distributed into voice parts determined by vocal range. Voices in transition have neither a child's treble range nor an adult soprano or alto range. This system of part allocation is detrimental to the physical and mental wellbeing of students experiencing voice transition. The establishment and use of new vocal parts, still based on range and ability, for voices in transition allow for student musicianship development to continue through the period of voice change and assist students in understanding physical changes of the voice as it matures and how to best utilise their new voice. Subsequently it is advisable that composers and arrangers reconsider the allocation of vocal ranges and associated skills for works aimed at middle school choristers, and arrange new choral works to the limitations specified for each vocal stage of development.

Similarly, composing choral works that cater

Figure 7. Vowel maps from Spectrograph recordings showing tonal homogeneity achieved after interaction with the choral works.



Student A; after interaction with the choral work and 12 months in the ensemble

Student B; after interaction with the choral work and 12 months in the ensemble

Student C; has not interacted with the choral work, and has only been in the ensemble for 6 months

for a wide range of linguistic diversity within the ensemble allows choirs to establish individual choral blend without the assumption of traditional tonal presets. This enables choirs to achieve homogeneity and enhances their sense of accomplishment.

No student should be denied a quality choral education because of the circumstances of their location and background. By changing the way we compose choral works for adolescent students with mixed ethnicities it is hoped that students might better engage with choral works through the pubertal stages and continue to participate in choir into to their adult lives.

Despite this study being conducted in the Northern Territory, with linguistic components unique to the local area, this methodology and its outputs of a teaching resource and associated pedagogy could be adapted and applied internationally with first nations peoples and second language speakers in many countries around the globe, helping choirs to carry more homogenous sound waves into the future.

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