

Ballet terms in the voice studio: a mixed methods study.

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PROJECT PROPOSAL

Ballet terms in the voice studio: a mixed methods study.

This research aims to discover if words linked to one motor process (ballet), could be utilised to learn a secondary motor process (singing) (Dos Anjos et. al., 2022; Tacchino, 2023; Mark et.al., 2023). Additionally, it is an investigation of how students experience familiar language in the potentially stressful context of the voice studio (Smith and Panazzi, 2020). The study's intended impact, is the possible discovery of a linguistic strategy to facilitate learning, which might ultimately link the pedagogies of song and dance.

Background

Music Theatre (MT) students are expected to achieve similar proficiency in singing, dancing and acting by graduation (Staffordshire University, 2024). The majority of the student cohort at the college in which the research is situated, (Houssay-Holzschuch, 2021; Vanini, 2008) identify as dancers. Ballet is foundational training for dancers (Lambrinos, 2019; Reality of Dance, 2015; Greene Haas, 2018) and is scheduled thrice weekly at college. Ballet training is typically long, (Twitchett, Koutedakis and Wyon, 2009) and through frequent repetition, its movements become conditioned (Crow, 2020; Lindblom, 2020). Ballet training uses "Kinaesthetic motor-imagery" whereby mental/motor rehearsal of a physical act (Karin, 2016 p2; Naito et al. 2002) is prompted by spoken instructions (Karin, 2016). Dancers, who are additionally inexperienced singers, lack equivalent "pre-existing motor-programmes" for singing in their neuromotor-system due to insufficient embodied knowledge (Karin, 2016 p2 ; Stoykov and Madhavan, 2015). Dancers therefore, can be nervous singers due to a lack of competence and experience (Haas, 2020). Ballet terms that initiate motor-planning for dance however, may additionally prime muscles beneficial to breath-management for singing, positively affecting students' understanding of vocal processes and thus improve confidence and potentially competence.

Rationale

Research over the past decade has recommended integrating singing and dance pedagogy when training Musical Theatre performers (Melton, 2013; Hagen et al. 2017; Edwin, 2015). Recommendations in the aforementioned literature have not been widely implemented prompting this researcher to investigate links between the two disciplines. The linguistic content of voice lessons might be adapted to expeditiously link pedagogies, as the content of

practitioners' verbalisations significantly affects student learning (Cummings, 2023). Additionally, ballet terms may externalise focus, facilitating the action of the neuromotor system which is responsible for smooth coordination of muscles (Cummings, 2023; Karin, 2016). Focusing students' attention away from areas of the body involved in the process of singing (larynx, jaw, tongue, lungs) to areas they are more familiar with using in a dance context (Haas, 2020) may improve performance (van der Veer et al., 2022). Embodied motor-plans linked to ballet terms (Karin, 2016) might be re-utilised as motor-plans for vocal processes if sufficient links between the two disciplines can be found.

Initial connections between the two disciplines

Literature concerning both dance and singing, emphasise the importance of optimised breathing (Kong, 2021; Devi, 2021, Hagen et al., 2020) furthermore, muscles used in singing, are also engaged in dance manoeuvres. Breath-management (Callaghan, 2014; McConnell and Romer, 2013; Griffin et al., 1995) is important in maintaining sufficient sub-glottal pressure (Traser et al., 2020; Griffin et al., 1995; Sundberg et al., 1991) to achieve a clear, and projected tone via control of the diaphragm (Dimon, 2018; Bunch, 1997). The “internal and external obliques, and transverse abdominus” (Bunch 1997, pp47-55) support the action of the diaphragm when singing, and help the dancer maintain balance (Greene Haas, 2018). The psoas is an auxiliary muscle of breath-support and is a hip-flexor used in most leg movements in ballet (Siccardi, Tariq and Valle, 2023). By utilising this muscle pairing already familiar to dancers, they may be able to manage their breath more effectively, during both singing and whilst dancing. The pelvic floor is used by both dancers in grand plié (Greene Haas, 2018) and classical singers (Emerich Gordon and Reed, 2020; Volløyhaug, Semmingsen, Laukkanen et al., 2024) and has a “synergistic relationship” with the diaphragm (Chapman and Morris, 2023 p65) maintaining respiratory efficiency during exhalation. In summary, muscles routinely used during dance are also used during optimised phonation. Ballet terms that are familiar to dancers and which trigger the engagement of these muscles, might additionally be used to initiate support of the diaphragm whilst singing.

Research Questions

The following questions will direct investigations throughout this study.

- Can ballet terms be used to communicate vocal technique to Music Theatre students?
- How are familiar terms experienced by students compared with unfamiliar terms in the context of a voice lesson?
- Can Motor-imagery (MI) used in dance be used to facilitate singing?

Research Methodology

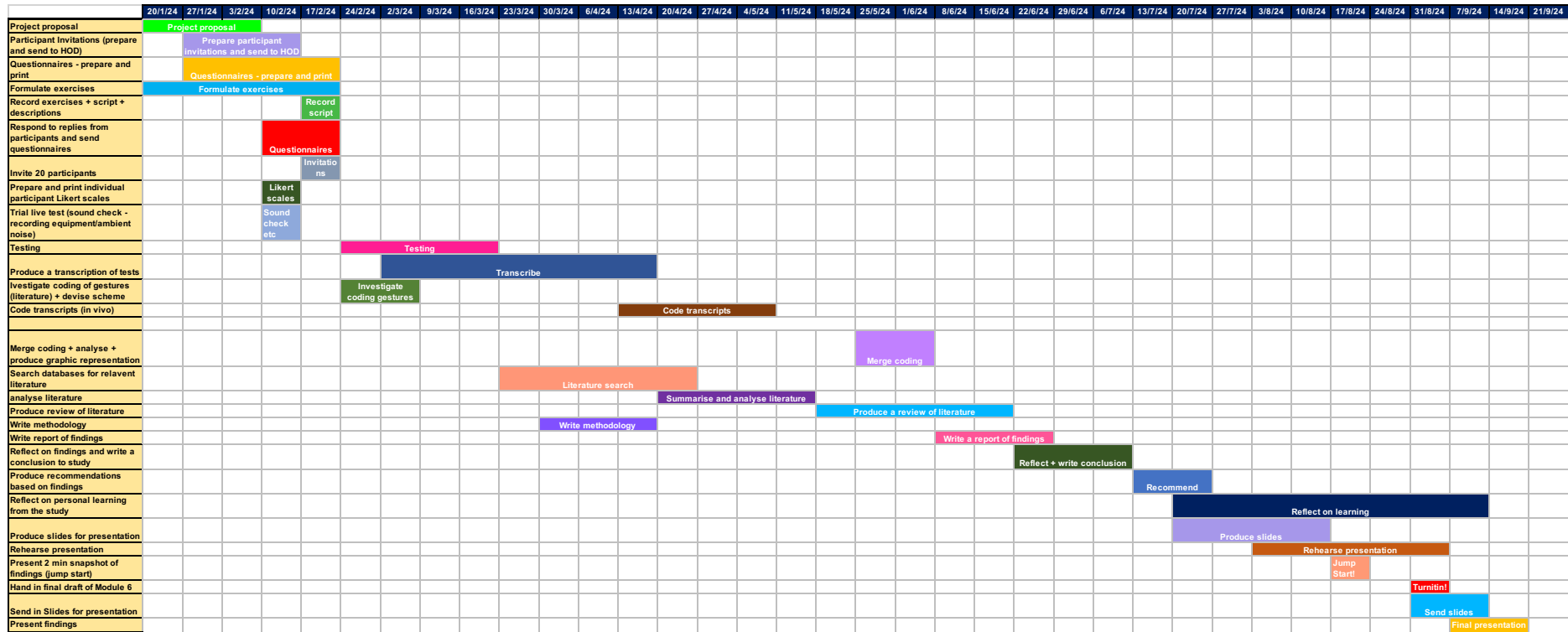
The intended research will be a mixed-methods study (Shorten and Smith, 2017) following a pragmatist paradigm (Allemang, Sitter, and Dimitropoulos, 2022; Holmes, 2020). As the author is an insider researcher (Labaree, 2024) with the lived experience of a practitioner in this specific environment, she is able to identify potential shortfalls in the current pedagogical regime. The experiment will have similarities to the participants' usual singing lessons and will be delivered in familiar surroundings, therefore it is hoped that they will be able to draw comparisons, to their normal one-to-ones. A mixed-methods approach will utilise quantitative and qualitative methods to answer to the research question (Tenny, Brannan and Brannan, 2022). An experimental design (Rogers and Revesz, 2019) will test participant responses to ballet terms, and the participants' Likert ratings of the exercises will provide statistical information as to the usefulness, or not, of dance descriptors. Qualitative data on how the terms are experienced by participants, will be gathered via semi-structured interviews. It is hoped that any effect of the experimental intervention measured quantitatively, can be explained by the qualitative data from the semi-structured interviews (Verhoef and Casebeer, 1997).

Methods

100 potential participants will be selected by the Head of Department (HOD), using convenience sampling, to provide an overall picture (Baxter, Courage and Caine, 2015). The inherent bias of convenience sampling will be partially mitigated by choosing participants previously unknown to the researcher. The first twenty respondents will answer a questionnaire to establish their existing knowledge of singing, dance and music terminology (Ponto, 2015). The aim of the study is to explore a strategy potentially useful for dance students, therefore participants identifying as singers, will be limited. The experimental stage will take place during March 2024 at college and will consist of the trialling of 10 recorded vocal exercises, which will then be scored on a 7-point Likert scale, according to perceived ease. Half the exercises will have additional ballet terms and these will be randomised. Results of the Likert scales will provide quantitative data as to whether the ballet terms were seen as an assistance or otherwise. Semi-structured interviews will conclude the test session to gather participant feedback on how ballet terms were experienced. Participants will be asked if they noticed the inclusion of ballet terms and how these were experienced. The experiment and interviews will be filmed and a transcript of participant comments will be produced and coded using in vivo coding and then analysed thematically.

Plan of Work and Time Schedule.

The Gantt chart below, shows how time was allocated to the different aspects of the research project. The X axis shows the time frame and the Y axis shows the elements of the study.



Ethical Implications

Insider researchers should consider the ethical implications of research studies, as there is potential for projects to affect the working relationship between the students and practitioner, where a power dynamic is already in place (Fleming, 2018). Students may feel enjoined to participate in the research because of the college's involvement in the selection process, therefore potential participants will be made aware of their right to refuse, or withdraw from the research at any time. The purpose of the research will be carefully explained to the participants to ensure that they understand that they are not being judged. Bad experiences, where a participant feels vulnerable or exploited during the research, may affect future willingness to participate in studies. By emphasising that their opinion is paramount, it is hoped that participants will feel empowered. Their assured anonymity should reduce any feelings of vulnerability. Students have a heavy workload and should not be inconvenienced, scheduling therefore, will be overseen by the HOD to limit overburdening and timetabling clashes. The college principals have taken an interest in the proposed study and the researcher may feel compelled to produce a definitive outcome. This has been mitigated by providing a thorough explanation of the research as an exploratory study where conclusions may only lead to new hypotheses and further research. It is vital that the research is unbiased and rigorously executed or the reputation of the UWTSD could be jeopardised. The researcher therefore, has randomised the vocal exercise descriptors, and asked the college HOD to invite participants in attempt to limit her influence. Recorded demonstrations and instructions will generalise the participant experience as will predetermining the interview questions. Results will be accurately reported regardless of outcome. Unforeseen ethical implications were managed responsibly in the researcher's previous study (Cummings, 2022) and lessons have been learned regarding the unpredictability of research (Jain, 2021). The true extent of learning during this process is as yet unknowable, and the only valid prediction is that it will be transformative (Mezirow, 1997). Transcripts of interviews and analysis, will be offered to each corresponding participant for them to check they have been correctly represented, to balance researcher/participant power dynamic and to re-iterate informed consent and their right to withdraw (Rowlands, 2021).

Learning outcomes: By the completion of this project, the researcher hopes to have:

- Discovered how Music Theatre students experience ballet terms when they are incorporated into a voice lesson.
- Leant how to successfully plan and carry out a research project.
- Learnt how to accurately report and present research findings.

INTRODUCTION

Title: Ballet terms in the voice studio: a mixed methods study.

This research is an exploration of how vocal and dance pedagogies might be incorporated, in accordance with recommendations from literature (Brown, 2024; Brown, 2018; Schröder, 2017; Hagen, Røsjø Kvammen and Lessey, 2017; Gaunt and Westerlund, 2013; Mourik, 2008; Hass, 2020) and poses the question: “How does the inclusion of ballet terms in a voice lesson at a performing arts college, impact dancers’ reception to, and experience of, the lesson when compared with the use of usual pedagogical language?”. Students of Musical Theatre (MT) come from singing, acting or dance backgrounds but the MT industry finds it expedient to employ performers skilled in all three disciplines, hence the term “triple threat” (Holmes, 2023; Houlahan, 2024; Hetherington, 2016; Gilroy, 2017). Leading artists often rise from the ranks of ensembles (Edwards, 2018) where players must be expert dancers who sing and harmonise, often whilst dancing (Houlahan, 2024; Mink, 2021; Berklee, 2024; Hetherington, 2016). MT students typically receive Acting Through Song (ATS) classes (Houghlathan, 2024; Warriner, 1992), and Musical Theatre Dance (Rumsey and Martincich, 2023), where students are taught to physically illustrate a story. Acting, therefore, is already integrated into both singing and dance pedagogies, however there is no specific training linking singing and dance. A clear understanding of the similarities between these two disciplines, and the development of unifying pedagogical strategy, might result in singing that is enhanced by choreography. Gaunt and Westerlund (2013), and Mourik, (2008) highlight a trend towards an integrated pedagogy encompassing singing and dance, however Hagen, Røsjø Kvammen and Lessey, (2017, p3) argue that the discipline specific instructions of song and dance, can seem “confusing and contradictory” and students themselves are expected to make connections without specific guidance. Hagen et al., (2017) point out that voice teachers only have second hand information about dance via their students and call for more ‘practice-based research’ to formulate an integrated pedagogical programme to teach MT students.

There are a few attempts to integrate singing and dance found in literature. Two interventions mentioned by Lansky, (2020) are walking whilst talking, a strategy used by practitioner DeMent, to normalise vocalisation for dancers during movement. Practitioner Kay Cummings, cited in Lansky (2020), recommended examining texts of songs, noticing the feelings these evoked, and extrapolating resulting emotions into movement. Hass (2020) emphasises the importance of the somatic experience of singing to her dance students and recommends employing movement during vocal practise. Morton, (2015) asserts that existing pedagogical

practices of dance and vocal training are contradictory, but proposes an intervention based on Melton's (2015) findings, that muscular similarities between the two disciplines exist. Melton, (2015) found that muscles implicated in breath management were also used in dance movements and postures. Glasheen (2017) had a similar approach and instructed dancers to lengthen their spine, which was identified as a desirable posture for both dance and singing and was preferable to continually pulling in their abdominals, which was a frequent instruction to dancers (Morton, 2015; Hass, 2020; Feller, 2018). The dancers were then encouraged to release their lower abdominal muscles as they held this posture and this release, was then incorporated into the choreography of a music theatre piece. Glasheen's (2017) intervention aimed to help triple threat performers cope with breath management whilst singing, and simultaneously dancing with high intensity. This current research differs from Glasheen's (2017) approach in that this is an exploration of an intervention that may assist dancers who are at an earlier phase of vocal development to become MT performers.

Dancers have typically studied for at least ten years by enrolment on an undergraduate MT course (Gomes, 2019; Clements and Norodin-Bates, 2020) but often longer (Berklee, 2024; Causey, 2024; Crow, 2020). The length and repetitive nature of vocational dance training, results in automatic motor-planning responses to words linked to dance movements (Karin, 2016, Lambrinos, 2019 p5; PBT, 2023). Conditioned skills enable dancers to adapt, to implement a range of acceptable outcomes based on circumstances, however motor-plans would be similar for each variation (Bailey and Pickard, 2010). It is therefore hypothesised that language that initiates muscular priming for a dance, might additionally prime muscles for vocalisation, where the same muscles are used for both activities (Melton, 2015; Morton, 2015). Ballet terminology, therefore, will be tested in the context of a voice studio in this research.

REVIEW OF LITERATURE

Dancers

As a population, dancers could be ideal singing students as they are physically fit, somatically and rhythmically aware, driven (Aujla and Farrer, 2015), discerning and conscientious (Hass, 2020; Edwin, 2015 pp79). Dancers are, however perfectionists (Norodin-Bates, 2019; Bemis and Barrada, 2011; Barefield, 2012) and may make incorrect conclusions of their vocal aptitude when comparing their attainment in singing to dance (Hass, 2020). A strong correlation has been found between perfectionism and imposter syndrome (Pannhausen, S., Klug, K. & Rohrmann, 2022; Rutherford, 2021; Henning, Ey and Shaw, 1998; Bloomsbury Institute, 2022) hence dancers may experience feelings of ineptitude, regardless of vocal potential. This same perfectionism and associated anxiety (Bemis and Barrada, 2011) may mean that dancers are more prone to nervousness than non-dancers in the voice studio. Dancers' perfectionism is usefully utilised when 'cleaning' choreography, whereby movements are refined during many repetitions (Sutherland, 2023; Bradley, 2016; Meador, 2017). An instruction to 'clean' a song rather than 'practise' it, may improve dance students comprehension of the activity, and is an example of how a linguistic adaption might be utilised in the voice studio.

Dancers and singing

The voice is a manifestation of self-identity (Barefield, 2012; Crow, van Mersbergen, and Payne, 2021) and vocal characteristics reveal individuals' emotional state, confidence, dominance and arousal (Guyer et al., 2021). Exposing one's voice to potential criticism, especially if prone to anxiety, is psychologically challenging (Carnevale, Cheprasov and Levitas, 2023). Dancers frequently lack self-belief concerning singing (Hass, 2020;) and do not believe they can, should, or are entitled to sing (Horvath cited in Ann Votaw, 2018). Dancers may feel vulnerable when asked to use their voices (DeMent in Feller, 2018). Miller (1996 p198) argued that competitive performers compared themselves to their peers, then extrapolated their own judgmental tendencies to view the audience as adversarial, leading to performance anxiety.

Breathing strategies of singers

Breath-management is equally important to singers and dancers yet as Hagen et al. (2020, p12) state:

"The teaching of 'support' and 'breathing techniques' seems to maintain the gap between teaching traditions within the field of song and dance".

Breathing is controlled by the central nervous system enabling organisms to breathe automatically and unconsciously (Franklin, 2019). Vocal training enables an extension of this automatic function so that singers may learn through muscular coordination, to delay the passive “elastic recoil” (upwards) of the diaphragm, extending exhalation (Dimon, 2018 p12). Air pressure through the vocal folds can similarly be regulated by muscular coordination to maintain appropriate adduction for tonal clarity (Bunch, 1997 p51). The external intercostals contract to raise the ribcage on inhalation and the internal intercostals contract on the outbreath pulling the ribs down (Pickering, and Jones, 2002; Dimon, 2018). Working in opposition to each other, these muscles coordinate to support the action of the diaphragm to maintain its tone, and thereby air flow is regulated (Gransee, Mantilla, and Sieck, 2012). Muscles of the abdomen, back and neck, also act upon the ribcage thus supporting the action of the intercostals and diaphragm to manage breath (Dimon, 2018; Bunch ,1997, p 47). A clear, resonant vocal tone during phonation, is achieved by glottal configuration and regulation of airflow managed by diaphragmatic support, (Griffin et al, 1995) and this muscle coordination differs compared with normal breathing (Traser et. al., 2016).

Muscles implicated in breath management that are used by dancers

The iliopsoas (iliacus and psoas, paired muscles) are implicated in breath management in medical literature (Siccardi, Tariq and Valle, 2023) and are included in dance literature in relation to both hip flexion and breathing (Greene Haas, 2018), their mention however, is largely absent from vocal literature. Medical literature connects the pelvic floor muscles with respiration but they are seldom mentioned in vocal literature, which implies that they have largely been overlooked as part of vocal apparatus (Emerich, Gordon and Reed, 2020). Female opera singers, however, habitually utilise the pelvic floor during phonation (Volløyhaug, Semmingsen, Laukkanen, et al. 2024). Pelvic floor activation has been found to be synchronous with the activation of transvers abdominus and internal obliques which are strongly implicated in breath management (Aljuraifani,et al.,2019; Pereira, et al., 2013; Sapsford, et al. 2001; Arab, and Chehrehrizi, 2011). Therefore, by activation of the pelvic floor muscles, the transverse abdominus and internal obliques are also engaged, positively affecting air flow in phonation.

Dancers and breathing

Excess tension has been called a “silent saboteur” that ruins the fluidity of ballet (Mahon 2023, p1) and Hetherington (2016) notes that in ballet choreography, a breath is often linked to a musical phrase implying a long, controlled breath is desirable. Dancers, however, are trained to continually retract their abdominals to fit an aesthetic (Caplan in Feller, 2018) and may fail to release them between phrases when singing, producing suboptimal breathing

(Haas, 2020; Melton, 2012). Continuous engagement of the abdominal muscles reduces their function during inhalation (Franklin, 2019) however, the internally located pelvic floor muscles are not specifically held in by dancers (Greene-Haas, 2018, p147) as they do not affect their preferred silhouette. Release of the pelvic floor muscles would relax the transverse abdominus and internal obliques allowing improved breath-management. Furthermore, an elongation of the spine as recommended by Greene Haas (2018, p146) and greater intensity of abdominal engagement during forced exhalation, could maintain the dancers' aesthetic but also improve breathing

Motor-planning and operant conditioning

Dancers learn by seeing and replicating movement (Burzynska, 2017; Karin, 2016) and once they have executed a step, its motor-plan is stored in the brain region called the hippocampus (Greene Haas, 2018 p19). They then plan choreography, comparing each viewed step with versions they have stored (Karin, 2016; Burzynska, 2017; Greene Haas, 2018). The mechanics of singing are internal, however, so dancers may be unable to accurately produce motor-plans for it. Dancers who are additionally novice singers, may be unable to visualise or feel the necessary motor-process (Bunch, 1997, p55), and could be thwarted in their vocal attempts. For example, dancers can use too much muscular effort whilst singing resulting in physical tension (Hass, 2020). If existing motor-plans for dance could be utilised for singing, then lack of vocal experience may be less impactful.

When a sensory trigger is experienced, the brain delivers messages to the body initiating movement in advance of a conscious decision to move (D'Ostilio K, Garraux, 2012). The peripheral nervous system is then primed to repeat the action when triggered again (Stoykov and Madhavan, 2015). Cross-modal priming is where an action word can initiate a primed motor-response that has been associated with it (Stoykov and Madhavan, 2015); the word 'yawn' can induce a compulsion to do so (Brown et al., 2017). Ballet manoeuvres may become operantly conditioned responses to an instruction or command (Kassing, 2013) if reinforced regularly over a long period.

"Ballet ...places great importance on the 'correct' execution of skills, which are honed over many hours of practice" (Bailey, and Pickard, 2010 p8).

Operant conditioning (Staddon and Cerutti, 2003; Skinner, 1938) has four variables:

- positive reinforcement – behaviour is rewarded – dancer is asked to demonstrate for the class.
- negative reinforcement – behaviour avoids punishment – dancer avoids reprimand from the teacher.
- positive punishment – behaviour is punished – dancer must repeat a strenuous exercise.
- negative punishment – behaviour results in loss – dancer is held back while the rest of the class take an exam and advance to next level.

Ballet training is typically begun in childhood and French terms are introduced as descriptive instructions (Kassing, 2013). Ballet is considered foundational training (Causey, 2024; Lambrinos, 2019; Woodward, 2017) with 90% of dance students learning ballet as part of their studies, and 82% of dance professionals regularly taking a ballet class (Stanis, 2019 p 60). Ballet terms initiate motor-planning that recruits muscles used in a dance manoeuvre, which may additionally be implicated for breath-management in singing (Melton, 2015). The term *frappé*, an instruction to make a glancing strike to the floor with the foot, recruits the iliopsoas (Greene-Haas, 2018) and as previously mentioned this muscle pairing, is implicated in the action of the diaphragm. The research hypothesis is that through “transference” (Schaefer, Patterson, and Lang 2013), conditioned ballet terms may prime muscles used in dance manoeuvres, potentially improving muscular processes for singing without explicit instruction (Stoykov and Madhavan, 2015). “Transference”, (Schaefer, Patterson, and Lang, 2013, Sefandonkis, no date) enabled stroke patients to re-learn actions by mentally rehearsing motor-plans for similar but different movements. A motor-plan for dance, therefore, may be recruited for singing, and initiated by a conditioned ballet term.

Language

The Language of the voice studio contains anatomical terms, words relating to coordinating processes, descriptions of sound, imagery, and Italian musical terms. Language varies between teachers depending on their approach and background, but the vocabulary is dissimilar to everyday speech and must be explained or deciphered. Unfamiliar language may amplify feelings of inadequacy in an already anxious student, and may negatively impact performance, whereas familiar language improves student confidence (Smith and Penazzi, 2020). Although ballet aesthetics have changed periodically and internationally, the fundamentals have remained constant and are universally understood by dancers; a *plié* is a *plié*. The familiarity of ballet language then, could potentially alleviate anxiety, provide somatic

information, and be an acknowledgment of students' existing skills and identity, enhancing student self-concept

METHODS

Methodology

The purpose of this research was to investigate a practical intervention to potentially improve learning experiences for music theatre students, many of whom identify as dancers. The utility of using ballet terms in the voice studio was therefore explored. A pragmatist paradigm (Kaushik and Walsh, 2019) was followed aligning with a mixed-methods approach (Ramanadhan, Revette, Lee et al., 2021) which measured the effect of an intervention quantitatively but also recorded the participants experiences as a gauge to how students might view it in the real world.

Participants

Participants were chosen using convenience sampling; students attending lessons with the researcher and their house-mates were invited to participate. There were 18 cis-gendered participants, 17 females and one male and the average (mode) age of the participants is 20. Two participants were in their third year of college, ten were second year and six were first years. Participants were categorised on the basis of their questionnaire answers with those labelled dancers having had the least amount of vocal training prior to college, singers as having had the least dance training. It is acknowledged that participant 7 did not submit a completed questionnaire but was categorised as a triple threat on the basis of her interview transcript in which she said that sang. In terms of vocal experience prior to college, participants 10, 16, 17 and 18 had received no singing training prior to college, although participant 16 attended violin and piano lessons which would have familiarised her with musical terms. Participant three had received only three private voice lessons which were delivered online, and participant 14 had 60-minute lessons 'around January'. Participant 8 had 20-minute lessons but only once a month over two years and participant 12 had 10-12, 30-minute lessons focused over 3-4 months. Participants 9, 4 and 5 had similar levels of experience having either studied singing as part of a one-year foundation course or having 60-minute lessons over 6 months. Participant 11 attended twice weekly 90-minute group lessons, but was found to be a very nervous singer and perhaps was the least competent. The groups referred to by participant 11 were not quantified, but the longer lesson duration perhaps suggests a larger group and therefore the lessons either consisted of ensemble singing or a scenario where singers volunteered to sing each week. In both instances a nervous singer could avoid notice and hence, training. Participant 11 admitted to difficulties in tuning which might have made

her reluctant to sing in a group context. Participant 2 passed the Scottish equivalent of GCSE music and had piano and singing lessons and participants 1, 6 and 13 had voice lessons since childhood at varying frequencies. Participant 15 had regular weekly voice lessons since the age of 12 of between 30-60 minutes and had passed GCSE music. All but participant 15 had extensive dance training although participant 1 was self-taught via 'YouTube videos' though was talented enough to be accepted onto a foundation course in dance. Eleven of the participants commenced dance training between the ages of 2 and 4. Participant 8 commenced dance training late (aged 14) but this could be due to gender norms of girls being taken to ballet class whilst boys attend sports practise (Jakubowska, and Byczkowska-Owczarek, 2018). Despite the use of convenience sampling, this cohort was representative of the current college population the, majority of whom are dancers with limited singing experience, and are sis gendered females.

QUESTIONNAIRE RESPONSES SUMMARISED

Participant	Age	Course	Vocal/other Training	Dance Training	Category
1	19	1 st year	30 min weekly privates over 3.5 years. Amateur dramatics shows since childhood	Self-taught dancer until age 16, then, a two-year foundation course, dance pathway.	Triple Threat with strong natural dance ability
2	22	2 nd year	Infrequent private voice lessons mainly over two years, during high school towards graded exams of one hour duration. Studied piano and took Scottish equivalent to GCSE in music.	4-5 weekly classes in ballet, modern, jazz and tap for 5 years and competed	Triple Threat
3	20	2 nd year	3 online private voice lessons of 30-60 mins and a few group whilst training for specific projects	Dance training since age 3 Tap, ballet and modern to intermediate grade. Competed since age 14 including dance World Cup, Margo's grad and Janet Cram. Trained between 4-7 days a week between ages of 14-18	Dancer
4	20	2 nd year degree	Weekly 30min 1-1s during foundation course in MT (2021) + group lessons.	Dance training since age 12. Modern, jazz, tap commercial and acrobatics. Multiple grades always achieving distinction Danced every day from 8.50 to 5.30	Triple Threat
5	18	1 st year degree	Weekly 60 min voice lessons for 6 months prior to college	Ballet training since age 2. Advanced 2 modern, advanced 1 ballet and intermediate tap. Started contemporary and jazz at 11 and commercial and technical jazz at 14.	Dancer
6	19	1 st year degree	Irregular private voice lessons since age 9 + weekly group work. Most private lessons were in years 9,10 and 13 and were 30mins duration. The majority of her lessons were in group context.	MT dance once a week between ages of 4 and 14. Performing arts school from year 10 to Y13 GCSE dance (included ballet, jazz and MT). Additionally trained 3 nights a week singing acting, dance and MT from Y11 -Y13 (ballet, jazz and MT dance). SOTE (performing arts foundation programme) training five hours every Friday night singing acting dance.	Triple Threat
7	DID	NOT	SUBMIT A COMPLETED	QUESTIONNAIRE	Triple Threat
8	21	3 rd year degree	Voice lesson of 20 mins once a month between ages 16-18 Both group and private were circled	Contemporary dance since age 14, added ballet and street from age 15 Full time training from 16, GCSE, A level and level 3 diploma in dance and is now at the end of his third year at college.	Dancer
9	20	2 nd year degree	Achieved "advanced diploma in performing arts" between 2019 and 2022. Weekly, 30 minute, privates during the diploma course, and twice/thrice weekly group lessons lasting up to an hour including Acting through song (ATS).	Dance training since age 3. Ballet, modern jazz, tap, contemporary, and lyrical. BTDA to advanced foundation and trained every week night and Saturdays.	Triple Threat
10	18	1 st year degree	No vocal training prior to college	Dance training since age 9 all styles except ballet which she started at 12 but has complete RAD intermediate. Danced 3 hours a day on weekdays and 5 hours a day on weekends.	Dancer
11	20	1 st year degree	Two years of twice weekly, group voice lessons, 90 minutes duration (tuning difficulties)	Ballet training since age 3 At age 12 added urban, hip hop, street, jazz and lyrical. A two- year diploma course, focused on ballet and jazz but included tap and commercial	Dancer
12	19	2 nd year degree	Weekly one to one voice lessons 3-4 months before audition 10 - 12 lessons in total of 30 mins duration	Ballet training since age 2 Contemporary, jazz, Tap, pointe lyrical, commercial and acrobatics added later. Danced competitively since age 8 training daily after school. Had a break at 14 (GCSEs?)	Dancer
13	20	2 nd year degree	Weekly voice lessons of 45 min duration both in privates and group settings. This was between the ages of 8-14 and 16-18	Dance training since age 3. Ballet, modern jazz, tap, contemporary, and lyrical. BTDA to advanced foundation. Trained every week night and Saturdays.	Triple Threat
14	19	2 nd year degree	Weekly 60 min voice lessons "Around January 22" Private or group not answered	Dance training since age 3 Trained in: commercial, jazz, ballet, tap, contemporary, heels work and acrobatics. Distinctions in modern, jazz and tap. Invited to ISTD events Triple distinction star after a two year, BTEC in Manchester	Dancer
15	19	2 nd year degree	Weekly voice lessons between the ages of 12 and 18 of between 30 to an hour ('sometimes') and took GCSE music.	No dance experience prior to college	Singer
16	20	3 rd year degree	No vocal lessons prior to college. She played the violin and piano.	Dance training since age 4. Ballet, tap and modern an hour a week per class. Completed ISTD intermediate in all three styles. A level dance which was "focussed on contemporary".	Dancer
17	20	2 nd year degree	No vocal training prior to college	Dance training since age 3 Ballet tap and modern. Since age 10, commercial, contemporary, and MT Every style twice a week. ISTD grade 5 ballet ISTD intermediate modern, ISTD grade 5 tap. Competed nationally, won a group championship 2019 duo semi-finalist, Professional pantos, junior ensemble in Sadler's wells dance show	Dancer
18	20	2 nd year degree	No vocal training prior to college	Dance training since age 2 ballet, jazz, tap, modern, contemporary, and commercial. Achieved BTEC and ISTD and RAD to advanced level 1 and higher. Whilst on foundation course, she 'danced all day, then had extra classes in the evening and at weekends'.	Dancer

Methods

Data collection methods consisted of a questionnaire (see Appendix 3), to establish previous training and knowledge, an experiment, and semi-structured interviews (see Appendix, 9). The questionnaire included thirty-three terms specific to ballet, music, or vocal pedagogy (eleven per category) which were randomised alphabetically. The questionnaire answers were summarised and participants were categorised as either singer, dancer or triple threat based on these findings (see Appendix 5). Vocal exercises were graded on Likert scores during the experiment and were then compared with the exercise randomisation sheet and scores for exercises with dance descriptors and those without, were added to make two totals. Higher scores indicated that the exercises were perceived as harder, therefore where the total score was higher for exercises without dance descriptors than for exercise with, the intervention was considered successful and vice versa. The scores were then processed through SPSS software to determine statistical significance.

Reflexive thematic analysis (RTA) (Braun and Clarke, 2020) was chosen as a theoretical framework to analyse the interview transcripts which were produced manually from the videoed interviews. Recurrent phrases used by the participants became apparent during this process, and these formed initial *In vivo* codes (Manning, 2017) (Table 2). Rereading the transcripts, dichotomous language was evident (Wierzbicka, 2007; Egan et al., 2007; Salters-Pedneault, 2024) which connected with perfectionism mentioned in dance literature (Angyal, 2021). Visualisation seemed linked to the participants' experience of ballet terms in the intervention and so became a code. Visualisation of motor-tasks activates the motor-cortex in readiness for movement (motor-planning) (Dupont et al., 2023; Lohr, 2015). Latent coding was then pursued to explore the underlying meaning of the participants words. The codes were organised into four themes initially, but after re-evaluation three different themes were constructed. These were: dance; singing; and language (Table 3).

Procedure

Participants either sat or stood (their choice) 3 metres from the researcher during the experiment, and were played recordings of ten vocal exercises (see Appendix 7) which they were asked to attempt and then rate in terms of perceived ease on a 7-point Likert scale (see Appendix 8). Each exercise consisted of an aim, an instruction, a demonstration and a dance descriptor. Each participant, however, only experienced half of the exercises with dance descriptors, which were randomised so that the combination of these differed for each person. Semi-structured interviews followed the experiments during which participants' overall reflections of the intervention were discussed. The experiments and interviews were videoed to collect visual and audio data to give a complete picture of participants' reactions.

The experimental stage

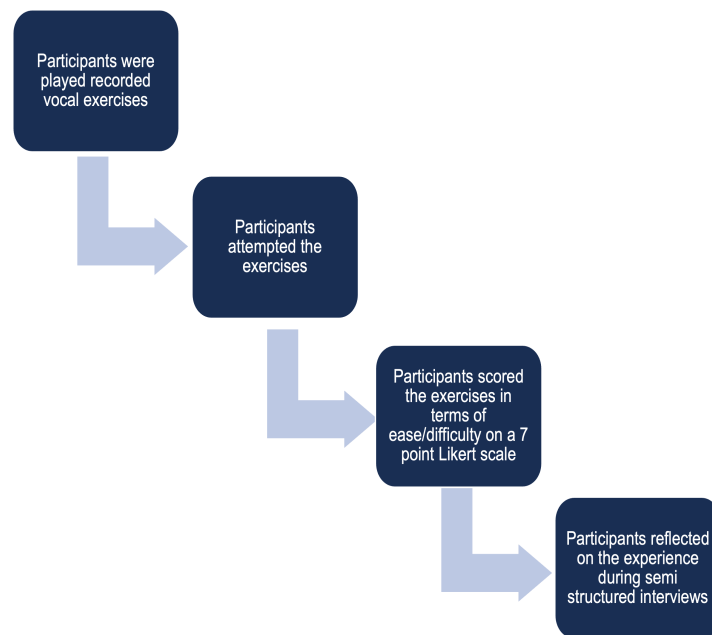


Figure 1

Ethical considerations

As an insider researcher, it was recognised that situatedness (Costello, 2014) has provided the motivation for the project. Furthermore, the researcher's pragmatic standpoint and world view has shaped the research at every stage. Acknowledging the power disparity inherent in the education system (Polley, 2023) the research project was designed to empower the student participants by seeking their evaluation of the research intervention. In this way the research and researcher were made vulnerable to criticism (Ross, 2017) and the power-base was thus shifted

How the exercises were devised.

The singing exercises were devised to help overcome technical difficulties and to link to ballet terms. It was hypothesised that the understanding and execution of the exercises would be enhanced if conditioned motor-planning for dance, was initiated by the inclusion of ballet descriptors. The range of the exercises was designed to be manageable for most voices (Randel, 2003) and participants were encouraged to choose their own starting note; there was no accompaniment (See Appendix 7 pp63-67).



Figure 2

Exercise 1 The exercise aim is to sing an arpeggio on an 'u' vowel in classical/legit vocal quality, and to encourage tilting of the larynx to achieve thinning of the vocal folds facilitating access to higher notes (Unteregger, et al., 2017). This laryngeal positioning differs from usual speech, during which greater vocal fold thickness is typical (Sundberg, 1990). Abdominal and back muscles must be engaged to maintain diaphragm tone during phonation (Macdonald, et al., 2012). The arabesque posture in ballet is iconic (Collins, 2023) and engages the core and back muscles, requiring high physical effort level to achieve (Zaichik, 2021). Motor-planning for arabesque may support the action of the diaphragm to produce clear tone. The melody for the exercise is an arpeggio formed from notes 1,3,5 and 8 of the diatonic major scale (Fuentes, 2020) ascending and descending. The tilted larynx facilitates achieving the octave range of this exercise.

Exercise 2 The aim of this exercise is to sing a series of diphthongs (vowel elision) utilising the tongue in preference to the jaw. For example, the letter 'l' makes the sound 'ah' then 'ee'

(aɪ in IPA) (Harding, 2024). Utilising the tongue to form diphthongs is more physically efficient than moving the jaw, the overuse of which during the performing life of a singer, might lead to localised tension. Movement of the tongue in this way often feels unusual to the student, however by using the imagery and somatic-planning for *tendu* (Bai, 2013) the student may potentially sense the required action.

Exercise 3 To sing an arpeggio to the text ‘Bella Signora’, so that the highest note is facilitated by an oval mouth position. The pelvic floor is activated synchronously with the transverse abdominus and internal obliques which support the action of the diaphragm during phonation (Talasza et al., 2022). When rising from a grand plié the pelvic floor is engaged (Bosman, 2023) therefore, if motor-planning grand plié is coordinated with the highest note in the melody the diaphragm should be supported, producing a clear tone.

Exercise 4 To sing strongly accented notes (*staccato*) on a single pitch but rising to the next note of the scale with each repetition, utilising core muscles. Accented notes on a vowel can be achieved through glottal-onsets, vocal fold collisions (Freeman, et al., 2012). Careful and judicious use of glottal-onsets is effective but can be vocally taxing if fold collisions are too violent or frequent (Leborgne and Rosenberg, 2021, p72). Alternatively, the abdominal muscles can be engaged to coordinate breath-management optimising fold-closure. The iliopsoas is a muscle pairing is a hip flexor (Siccardi, Tariq, and Valle, 2023) that is used in *Frappés* (sharp kicks)(Paskevskaya, 2005 pp117-118). The iliopsoas is implicated in supporting the action of the diaphragm therefore motor-planning for *frappes* should aid articulation. The exercise uses a consonant ‘B’, eliminating glottal stops, however without an additional instruction to accentuate the consonant or shorten the notes, it is unlikely that a strong *staccato* will be achieved without using the abdominal muscles.

Exercise 5 The aim of this ear-training exercise, is for students to accurately copy a simple melody with text. The text consists of numbers chosen to correspond with the degrees of the diatonic scale and also positions of the feet in ballet, where ‘four’ was equivalent to *devant* or *derrière* position (King, no date). If the heels are placed on the floor in these positions, it is called fourth position (Britannica, 2023). When the foot is out to the side this is known as ‘a la second’ or second position (Britannica, 2023). It is hypothesised that motor-planning will aid tone and tuning accuracy (Liao, 2002; Liao and Davidson, 2015). This exercise establishes the connection between the numbers, positions of the feet and intervals of the scale in preparation for the next exercise.

Exercise 6 The aim of this exercise is to sing the melody so that it is uninterrupted by the text. Having established in the previous exercise that numbers relate to degrees in the scale, the pattern is changed to 1, 4, 2, 4, 1. When a dancer executes this pattern they will move the leg forwards then to the side and then to the back describing a semicircle with the leg. This exercise is known as *rond de jamb a terre*, meaning circular movement of the leg where the foot maintains contact with ground (King, no date). The dancer must slide the foot continuously, passing through the quarter positions at the correct point in the music without stopping or jerking. The sliding pressure of the foot on the floor may be similar to the sensation of singing *legato* (smoothly).

Exercise 7 *Staccato / legato* exercise. The aim of the exercise is to achieve a difference in articulation short and sharp and then smooth. Having established *frappes* and *rond de jamb a terre* as corresponding to *staccato* and *legato* phrasing, this exercise alternates between the two. *Staccato* on the ascending phrases and *legato* on the descending, envisaging the two ballet exercises. A melodic pattern developed from an *arpeggio* was used.

Exercise 8 *Yodelled octave jump*. The aim of this exercise is to alternate between voice qualities and involves tilting the larynx to thin the vocal folds, and returning to a thick folds position as in speech, producing a yodel (Echternach and Richter, 2010). As identified in exercise 1, maximal muscular engagement is desirable in thin folds position which is similar to the sensation a dancer experiences during *relevé* (Britannica, 2023). By sensing the heels on the floor during speech quality, and suddenly increased abdominal engagement as in *relevé*, when ascending the octave interval, the student may experience the flip from one vocal quality to another.

Exercise 9

This exercise aims to help the student experience abdominal release as in “Accent Breathing” (Morris, and Hutchison, 2016). By reducing explicit focus on breath management, it is hoped to promote natural breathing patterns. Whilst singing ‘Amazing Grace’ (Newton, 1772; Lynskey, 2024) the student should envisage being in *relevé* whilst singing, then executing a *plié* whenever a re-engagement of muscles is needed at the end of a phrase. ‘Amazing Grace’ has been graded as ‘intermediate’ by Trinity college of music (Trinity, 2023) and was chosen for its popularity (Coghlan, 2023).

AMAZING GRACE (EXERCISES 9 and 10)

J. Newton (Lyricist) 1772
William Walker (composer) 1835



Figure 3

Exercise 10

The aim of this exercise is to utilise motor-planning for port de bras (Boesch, 2020), in which the back and core muscles engage to support the arms, to additionally assist students to sustain the long phrases of 'Amazing Grace'.

RESULTS

Quantitative Results

The mean average of scores for exercises without an additional dance descriptor ($M = .88$, $SD = .20$) was higher than the mean average of score for exercises that included dance terms ($M = .85$, $SD = .25$). The difference of mean averages, shows a trend indicating that exercises with an additional dance descriptor, were perceived as easier by the participant cohort as indicated in figure 1.

A paired t-test was conducted to explore the significance of this trend; however, it was non significant $t(17) = .508$, $p = .618$, $d = .120$.

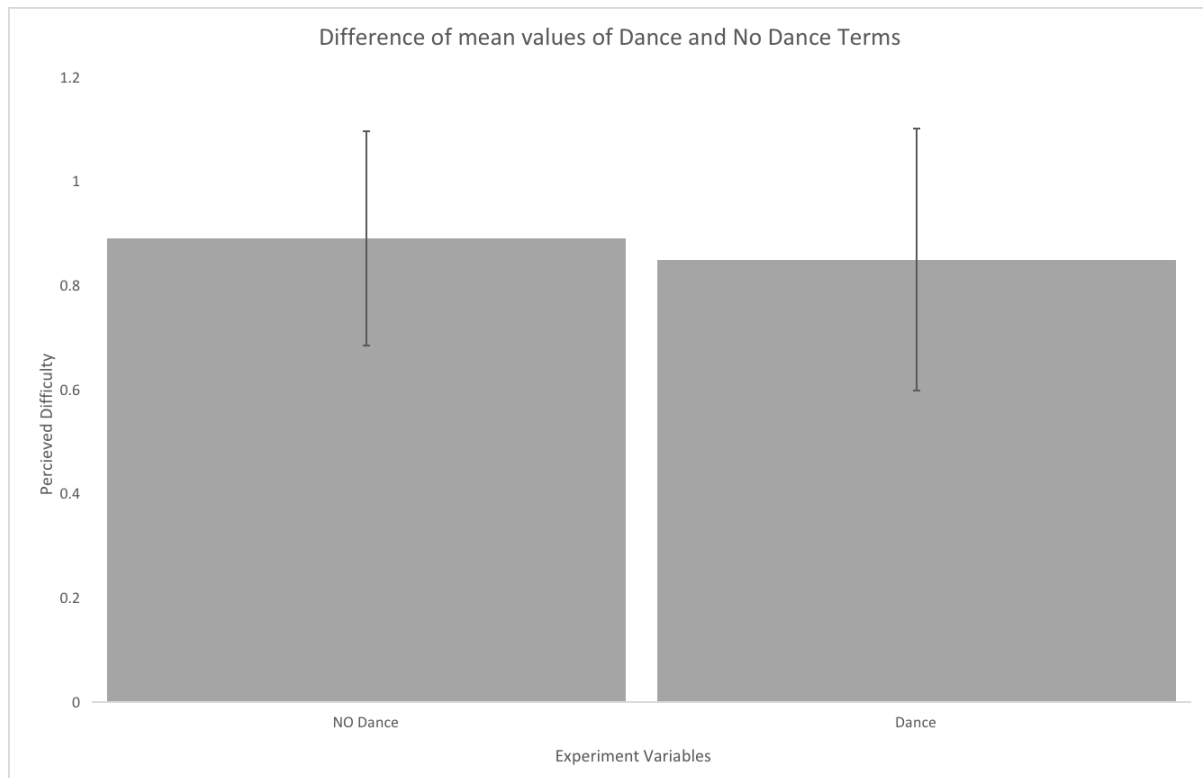


Figure 4. Exercises were scored on a 7-point Likert scale in terms of perceived difficulty, with a lower score indicating greater ease. This graph shows the combined average score for exercises with and without dance terms, and indicates a small trend in favour of the inclusion of ballet terms as a useful intervention.

Further investigations were conducted to investigate the impact of dance terms, or not, between the three groups of participants (singers ($n=1$), Dancers ($n=10$) and Triple Threat ($n=7$) performers). Descriptive statistics (means and standard deviations) are reported in the table (table 2) below:

Table 2

Skill Set	No Dance Term Included		Dance Term Included	
	Mean	Standard Deviation	Mean	Standard Deviation
Singer	$M = .66$	$SD = .$	$M = .88$	$SD = .$
Dancer	$M = .92$	$SD = .15$	$M = .97$	$SD = .23$
Tiple Threat	$M = .86$	$SD = .20$	$M = .85$	$SD = .17$

A univariable ANOVA was conducted to investigate the impact of not using dance terms between these groups. Levene's test revealed the assumption of homogeneity had been met (.495), however this test produced a non significant result ($F(2/15) = .737, p = .495$).

A second univariate ANOVA was conducted to investigate the inclusion of dance terms for each group Singers ($M = .88; SD = .$), Dancers ($M = .97; SD = .23$), and Triple Threat ($M =$

.85; $SD = .17$). Again, the Levene's test revealed the assumption of homogeneity had been met (.495). On this occasion a significant result was obtained ($F(2/15) = 3.789$, $p = .030$). Post hoc investigations into the differences between groups were unable to be obtained due to one of the groups (singers) having only a single participant. Therefore, a t-test was run to investigate the relationship between triple threat performers and dancers, this test also revealed a significant result ($t(10) = 2.607$, $p = .026$). When considering the means in relation to this t-test result, it can be determined that for this sample, dancers found it significantly more difficult to engage with the exercises with dance descriptors.

Questionnaire results

Participant 1 indicated on the questionnaire that she was 'confident' in her knowledge of all of the ballet terms except 'ronds de jambe á terre', despite completing a two-year foundation course in dance. This is unusual, as all of the ballet terms used in the project were of grade 3 level or below, but the term seems to have been especially problematic, as participants 4, 6 and 13 did not recognise this term, and participants 6, 8, 9, 15 and 17 indicated only 'partial knowledge'. It is possible that the participants were not used to seeing this dance term written down, and the spelling of leg ('jambe') may have been confusing (Koyfman, 2021). The other French terms were identified by the majority of the participants who were either 'confident' or had partial knowledge'. Participant 6 additionally indicated no knowledge of the terms 'bras bas' or 'frappé', and only partial knowledge of 'adage', and 'grande plié á la second'. The researcher categorised participant 6 as a 'triple threat' based on her questionnaire responses, and despite achieving GSCE dance this participant's knowledge of ballet terms seems to have been the least secure of all the participants. Interestingly, participant 15, who had not received any ballet training prior to college, indicated secure knowledge of all but one ballet terms. This seems an unexpected result but perhaps the participant's awareness of their lack of ballet training had resulted in extra effort to fill a knowledge gap (Oliveira, Santos, Severnini, 2024). Participant 2 had partial knowledge of 'adage', 'arabesque' and 'bras bas' but indicated that she had learnt ballet for five years. None of the terms when spoken in the experiment prompted the participants to ask for clarification but this could have been due to their nerves. Alternatively, it may be possible that the participants understood the terms when they were spoken but were uncertain when they saw the words written down (Koyfman, 2021). If the experiment is repeated, it may improve clarity by reading the terms to the participants, however musical terms are always printed in the sheet music (score) and perhaps less frequently heard spoken by non-musicians, so it may be difficult to match conditions and also randomise the terms.

Illustrated below (figure 5), is a summary of the participants' answers from the Likert scales in the questionnaires. A list of 33 words and phrases pertaining to ballet, vocal studies or music were placed in alphabetical order to randomise them. The participants rated the terms from 1-3 according to their understanding, indicating they were either 'confident' (1), had 'partial knowledge' (2) or were unfamiliar with the term; 'don't know' (3).

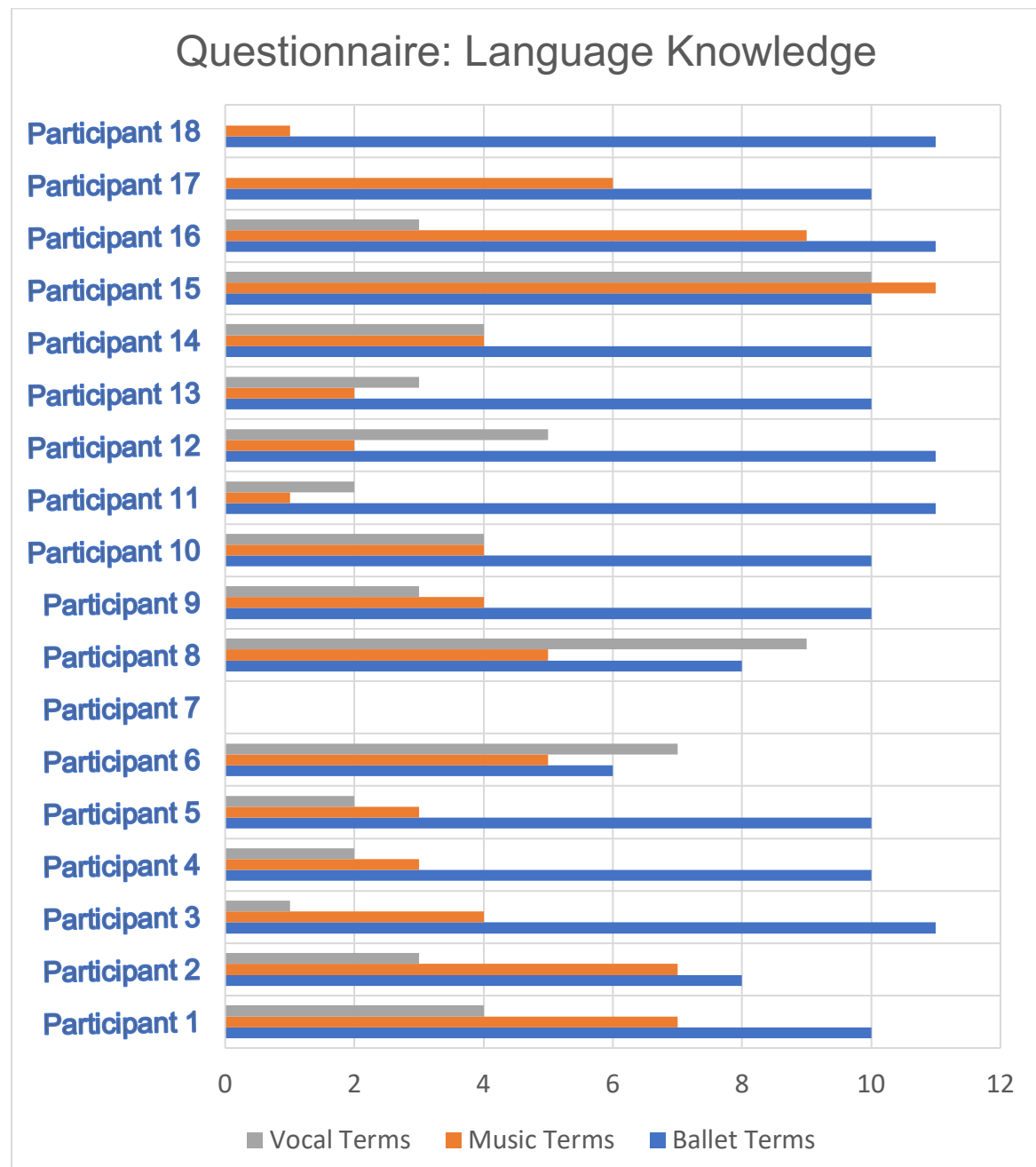


Figure 5 Participants' scores relate only to terms where they indicated they were confident in their knowledge of a term. For example, Participant 18 indicated confident knowledge of all 11 Ballet terms; 1 of the music terms but none of the vocal terms, hence there is no grey bar. Participant 6 had a moderate knowledge of all three categories, but knew the fewest ballet terms; and Participant 15 had the best all round knowledge.

Combined Likert scores for the vocal exercises divided into 'dance' and 'no dance' conditions.

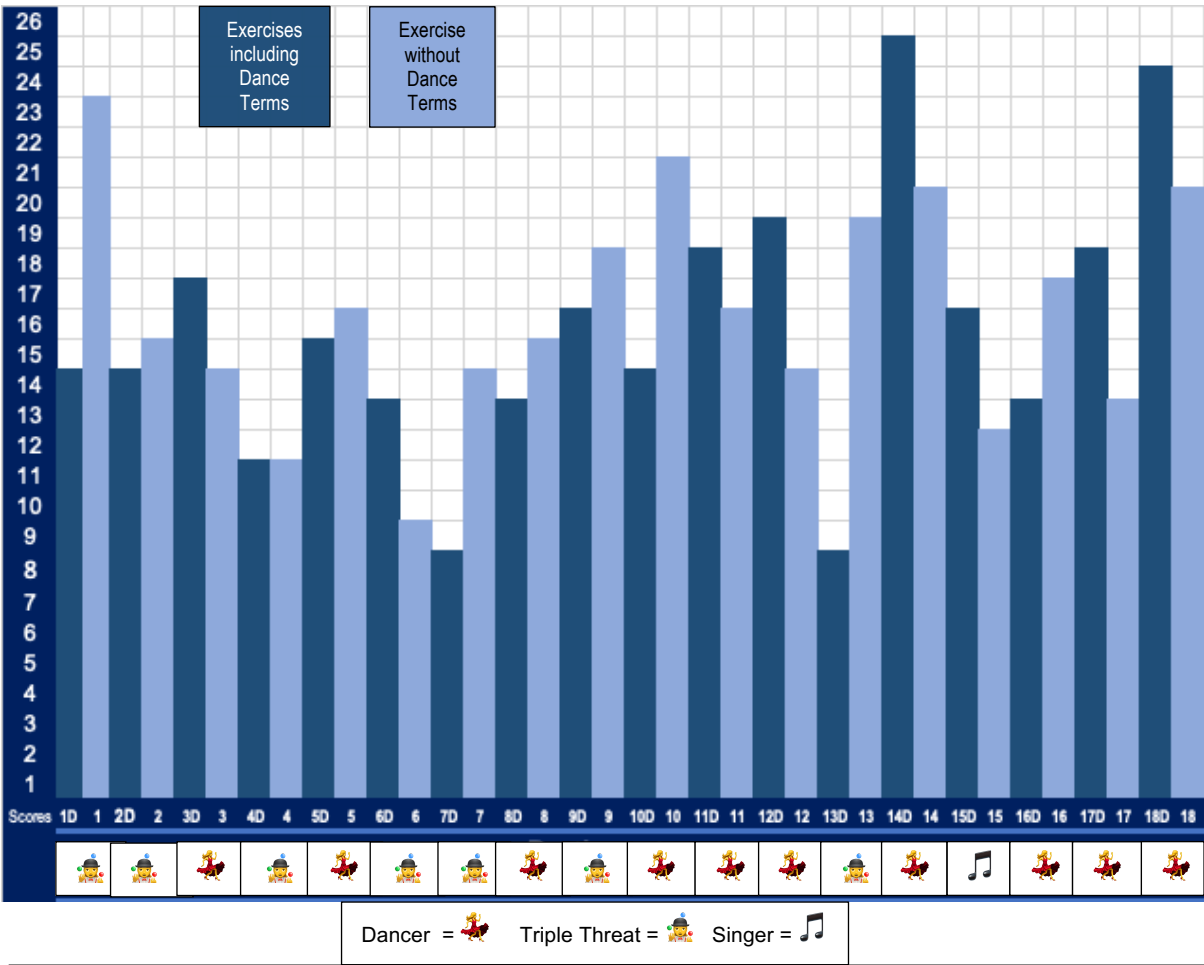


Figure 6. Participants scored vocal exercises in terms of difficulty on a seven-point Likert Scale (1= Easy and 7 = Impossible). Half of the exercises included dance descriptors and these were randomised. Participants are shown along the x axis, including their categorisation as Dancer, Triple Threat or Singer; the y axis indicates sum of scores. The dark bars indicate the combined score of exercises where a dance descriptor was included and the lighter bars indicate the combined scores per participant where there were no dance terms included in the exercises. The height of the bar correlates to how difficult the exercises were perceived. When a participant's lighter bar is higher than their dark bar, the inclusion of dance terms was found to be beneficial.

Qualitative Results

Themes generated from several rounds of inductive, In vivo and latent coding are presented in Table 3.

Table 3.

Theme:	Dancers are nervous singers
Sub themes:	Lack of experience – lack of competence – lack of confidence Master > student power - perfectionism – dichotomous thinking Visual learners – lack of visual elements in singing lessons Identity – lack of relatedness Fear - avoidance
Theme:	Pedagogical language is excluding
Sub themes :	Discomfort Confusion - humiliation - vulnerability Does not aid visualisation Lack of relatedness Negatively affects self esteem
Theme:	Dance language is relatable and prompts visualisation and motor planning
Sub Themes:	Familiarity – comfort - competence Identity – being 'seen' Safe Relatable Visualisation – motor planning - understanding

Explanation of themes

Dancers are nervous singers

Vocational dance training typically often limits the time available to study singing, resulting in many of the strongest dancers lacking vocal experience:

“People who have come from such a strong dance background where you never use your voice, it’s like so daunting” (Participant 10).

Coupled with dancers tendency to be perfectionists, a lack of competence in singing may leave them feeling vulnerable:

“If you’re a dancer you are constantly wanting to be perfect... and when they don’t get things right it makes them ...feel vulnerable” (Participant 7).

Vulnerability and a lack of relatedness could lead to anxiety:

“I think they really struggle and feel out of their depth and feel like not understood” (Participant 13).

“(I’m) scared, like I’m not a very confident singer” (Participant 14).

“When I just think about singing, I get quite overwhelmed” (Participant 5).

Fear of judgment, both self-inflicted and external, might sometimes lead to avoidance of singing:

“There’s a lot of negativity around coming to a one-to-one ‘cause they think they can’t sing, dancers, they think they’ll get judged” (Participant 7).

Pedagogical language is excluding

The use of technical language could be seen as overly intellectual and confusing:

“If you were to give me lots of fancy singing terms I don’t think I’d understand” (Participant 3).

Pedagogical language may negatively impact focus in lessons:

“...more switched on than hearing lots of foreign things being said” (Participant 2).

Overuse of complex language in lessons might affect self-esteem and cause anxiety:

“It makes me feel a bit like, not intelligent because I don’t know what they are talking about.” (Participant 3).

“There was so many like new words erm and like, I kinda go all scary... Like they kind of just throw all the terms out at you” (Participant 10).

Pedagogical language could be viewed as lacking in clarity and somatic information:

“We’ll be told what to do but not necessarily how to do it” (Participant 13).

“There is a lot of it that I don’t really understand” (Participant 11).

Technical language may need to be explained, affecting the flow of lessons and perhaps leaving the student feeling patronised:

“They are talking to you, like trying to make you understand, you are maybe a tiny bit babied” (Participant 19).

Dance language is relatable and comforting

Ballet terms can be experienced as familiar, safe, and a comforting distraction from the perceived tension of a voice lesson.

“I feel like having someone relate it to dance made it like feel a lot more comfortable like ok this is a safe space.” (Participant 10).

“...relatable terminology, it sort of calms you down... it’s a reinforcement and a safety net... it’s something comforting as opposed to a stress” (Participant 16).

“When things are explained to me in ballet terms I feel a bit more in my comfort zone and I feel like it makes more sense” (Participant 5).

Hearing dance language may focus the minds of dancers.

“(it) really helped me to focus” (Participant 16).

“Focussed, really focussed it meant you knew exactly where you were placing everything” (Participant 6).

“It actually helped me to like focus more because it is something that I know” (Participant 2).

Dance language could add a visual element to a voice lesson providing dancers with a style of learning to which they have become accustomed.

“Very visual which helped because you could picture what you were doing and it was affecting the sound” (Participant 6).

“it was easier for me to like visualise” (Participant 7).

Ballet terms might provide somatic information as to how vocal exercises should be experienced, by linking dance to similar motor patterns and muscular engagement in singing.

“I can like see myself doing it and like, well then it almost feels like the same but not the same” (Participant 4).

“I was actually creating the feelings that make me do a better sound or like when I was thinking about the positions” (Participant 9).

Using dance language was seen to acknowledge the expertise and identity of the student participant allowing them to feel ‘seen’.

“I really enjoyed listening to language that I am familiar with because it’s like speaking my dancer language” (Participant 8).

“When you relate it, it doesn’t make you feel as stupid” (Participant 17).

“It makes me understand that like *you* understand more... you made me feel like OK you *do* want me to get it and made me feel more understood and seen” (Participant 4).

DISCUSSION

As was seen in the results section, the statistical significance of the experiment was minimal however 18 participants was small sample size for a quantitative study and it is possible that with more participants, the trend may have been more significant. There was, however a significant result based on skill set for the use of dance terms; absence of dance terms had no effect, however using dance terms made a difference. The one way ANOVA indicated there was a difference of effect between groups based on skill set, but not which groups were affected and how. The singer group had only one participant and was therefore removed from the equation so that a t-test could be carried out to determine whether there was still a significant difference between dancers and triple threat performers. The t-test showed a significant difference between triple threats and dancers and that dancers found it significantly harder to execute the exercises with the addition of dance descriptors.

Participants categorised as 'triple threats' from their questionnaire responses were, as a group, the most positively affected by the inclusion of ballet terms, however all participants reported a reduction in stress when the intervention was applied. The Triple Threats relative familiarity with singing compared with the dancers, might have resulted in lower anxiety overall during the experiment, and therefore perhaps greater engagement with the intervention. This accords with MacIntyre (1995) who states that anxious students' attention is divided between assimilating new information and coping with their feelings of nervousness. Burden (2004) agrees, asserting that anxiety is a distraction from learning. Participants whose questionnaire results indicated unfamiliarity with musical and vocal language, may therefore have been adversely affected by the addition of ballet terms. Despite Participant 6's categorisation as a triple threat, she scored the exercises with the applied intervention as being more difficult. Her questionnaire answers, however, reveal that her knowledge of ballet terms was not as secure as some of the other participants, and this would have affected her reception of these words in the intervention. Participants 8 and 16 were dancers with positive results but were in their third year of college so would have had longer vocal training, equalling the experience of triple threats.

QUALITATIVE ANALYSIS

Dancers are nervous singers

Throughout the transcripts emotionally charged words such as "scared" (Participant 10) , and "vulnerable" (Participants 7 and 12) reoccurred, and were always connected with singing. Participant 13 who was categorised a triple threat, nevertheless felt her vocal competence

was lacking, perhaps in comparison to her dance skills, and thought this was generally the feeling amongst dancers:

“I think they (dancers) really struggle and feel out of their depth” (Participant 13).

Participant 14 found the experiment challenging because she was “really nervous” due to her vocal insecurities, and this was affecting her college experience:

“I would never understand what I’m doing, why I’m doing it...I can like, never get up in the lesson and sing, I’m terrified of doing it...I’m scared of people judging me”.

(Participant 14)

Participant 11 was a self-confessed nervous singer and had unreliable intonation, although her questionnaire answers indicated that she had received significant vocal training. Participant 14’s tactic of evasion perhaps sheds light on participant 11’s lack of competence if she too used avoidance as a coping mechanism. Perfectionism is strongly linked to self-esteem and judgement (Fekih-Romdhane, et al., 2023) and is a recurrent trait amongst dancers (Angyal, 2021).

Perfectionism and anxiety

Perfectionism in dancers is documented in dance literature where it has been identified as particularly identified with classical ballet training (Nordin-Bates, 2019). Participant 7 recognised perfectionist tendencies and the affect this can have on dancers, which she asserts is almost the norm for her cohort:

“I’m a perfectionist, I don’t like not knowing what I’m doing...I think it is very common for dancers.”

(Participant 7)

She identified the root cause of dancers’ vocal anxiety as the combination of perfectionism and lack of competence, and described the impact of this on students’ education:

“They just won’t come to the one-to-ones ‘cause they’re scared to sing. They don’t wanna sing, it doesn’t make sense to them. It puts them under pressure it makes them vulnerable.”

(Participant 7)

Participant 12 confirmed this assertion saying that she did not feel, “comfortable in singing, I feel more vulnerable” as did participant 17 who stated:

“I feel very vulnerable when I’m talking about myself, let alone singing by myself.”

(Participant 17)

Participant 10 had received no vocal training prior to college and stated that she was “quite nervous and ...scared to sing”. She continued to describe the scale of vocal anxiety amongst dancers:

“Even my friends from other colleges,...it’s like so daunting ... A lot of people in my class really struggle.”

(Participant 10)

When participant 18 was asked how her year group felt about singing she said they were “scared”. Participant 11 experienced a physical symptom possibly related to anxiety and confessed “I struggle to drop my jaw quite a lot.”

(Eske, 2024)

Pedagogical language is seen as excluding

The participants said that the language associated with singing and music exacerbated their anxiety and caused confusion. Participant 2 confessed that she was “not ... really confident with all the terminology” and Participant 3 suggested an over reliance of practitioners on pedagogical terms “they just use a lot of singing terminology” which she found demoralising. Participant 11 also had difficulties “... there is a lot of it that I don’t really understand”. Participant 17 expressed hopelessness yet blamed herself, pretending to comprehend as a coping mechanism:

“...when they’re like explaining something I’m like I don’t really get it. I don’t wanna like, ask and go into more detail because I feel like I should know ...like if they’ve already explained it, and I’ll be like ‘ok yeah I’ve got it..”

(Participant 17)

Participant 16 thought that in general, little supplementary explanation was offered and that the language of voice lessons was standardised “a lot of the time they just sort to stick to the exact vocal terms” whereas Participant 6 was frustrated by a lack of clarity:

“If somebody describes to me a singing term I think they have such subjective meanings, whereas dance tends to be quite cohesive in of the fact that if it’s a ballet

term it is what it is, there is no other version. There is a right way to do it and a wrong way". (Participant 6)

This comment illustrates the dichotomous thinking associated with perfectionism (Wierzbicka, 2007; Egan et al., 2007; Salters-Pedneault, 2024) which is recurrent in the transcripts: "making sure I was sounding right" (Participant 17); "if you went wrong" (Participant 16); "that probably isn't right" (participant 12); "get it vocally right" (participant 16); "I didn't know I was doing it correctly" (participant 12); "where my placement was meant to be" (Participant 13); "I think I do it more correctly" (Participant 3). Dichotomous language is frequently used by the participant cohort; therefore, it is reasonable to infer perfectionistic tendencies which may be affecting their self-judgment, potentially resulting in anxiety. Returning to the assertion of Participant 6 that pedagogical language is "subjective" the National Association of Teachers of Singing (NATS) held summits in which the evolving language of vocal pedagogy was discussed (Rollins Biglerand and Osborne, 2021). Ongoing discoveries in voice-science have meant that language is updated and revised but new terms take time to filter through to vocal practitioners. Added to this, there are different schools of teaching such as Estill Voice Training (Fantini et al, 2016), Complete Vocal Technique (CVT) (Sadolin, no date), Classical Bel Canto (Magid, 2023) and Hustler Technique (Hustler and Rodd-Marling, 1976) all of which have different terminology. It is reasonable to assume that college students who are taught by multiple teachers, may be exposed to a plethora of pedagogical language and even when there are attempts at standardisation, the evolving nature of voice science means that terms can be subjectively applied. An article published in the Journal of Singing (Popeil, 2007) described four different types of 'Belt Voice' for example, therefore two teachers describing Belt Voice may confuse a student. Added to this there is perhaps a perception amongst some students that practitioners deliberately use pedagogical jargon to maintain the power disparity as a means of control (Shannon, 2019):

"you do feel a little bit silly." (Participant 17)

Participant 3 also thought that pedagogical language was unhelpful and belittling:

"I feel a bit slow like I don't understand what they're saying." (Participant 3)

Participant 4 noticed limitations of the language being used in voice lessons:

“...in singing in general, it’s if that doesn’t work for you there isn’t any other option and if you don’t get it, you don’t get it.” (Participant 4)

Participant 14 was not convinced of the effectiveness of complex language to describe vocal technique “It just doesn’t click exactly” and Participant 7 felt similarly:

“...it takes a longer time for me to process and I have to either watch them do it, or ask them to repeat it again and it takes like,.. it’s a bit more time consuming.” (Participant 7)

Participant 7 identified how extra cognitive effort is needed to translate unfamiliar words, slowing execution of instruction. Her last comment highlighted the need for visual elements in voice lessons to correspond with dancers’ preferred learning.

Dance language prompts visualisation

Dance training is typically delivered as demonstration which potentially biases dancers preference for visual learning over time, due to familiarity (Harbonnier and Barbier, 2012):

“When I’m dancing normally you get given like erm like someone will just demonstrate and when someone demonstrates it like it’s, ok I understand it.” (Participant 12)

Several of the participants commented that they were ‘visual learners’ such as Participant 11 “I’m more of a visual person” and Participant 10 “I’m like definitely, I’m quite a visual learner.” Participant 12 also identified as such, and offered an insight into how dancers potentially view voice lessons:

“I’m quite a visual learner, we have the teacher in front of us, but normally they wouldn’t be doing anything, they’d just be playing (the piano).” (Participant 12)

It is interesting that participant 12 did not view the complex activity of playing a piano as “doing anything”. Perhaps her meaning was that the practitioners did not appear to be doing anything, from her perspective, that would inform motor-planning, because there is no overt visual element as there is in dance. When asked if students are given vocal demonstrations she confirmed this but said:

“I do view it as a demonstration, but I don’t look at them, well I do look at them but I don’t take in what they are doing.” (Participant 12)

What she was describing is passive, rather than active observation (Bazzini et al., 2022). Dancers watch choreography actively, as they are expected to quickly encode, memorise and then replicate it. They must take in every movement, compare them to memorised versions, adapt where necessary, then replicate the choreography (Wilmerding, and Krasnow, 2024). Dancers may not encode motor-plans during a vocal demonstration as muscular engagement during singing is less overt, and they may therefore observe it passively (Karin, 2016). Participant 12 said that after a vocal demonstration “I would just maybe be kind of copy because I didn’t have a deeper understanding of it”, the deeper understanding she speaks of is likely motor-planning.

Repeatedly watching dance demonstrations creates a large store of memorised dance manoeuvres so that choreography does not have to be encoded movement by movement, but rather a manoeuvre is recognised and all its components are instantly primed leaving only small modifications needed to match the target demonstration (Wilmerding and Krasnow, 2024). These plans have attached command words (ballet terms), so that when the command is heard the whole manoeuvre is primed (Wilmerding and Krasnow, 2024). During priming, visualisation also occurs (Ridderinkhof and Brass, 2015) and participants reported visualisations of ballet manoeuvres during the intervention, implying motor-planning was also activated. Participant 1 said that when visualisation occurred she experienced reduced effort:

“I really liked the visualisation stuff like with the dance ...when the imagery that was with it, it was easier.” (Participant 1)

Participant 12’s language was notable as she connected the intervention with having a physical demonstration which is what she had found lacking in other contexts. Active observation of vocal demonstrations may provide dancers with much needed somatic information on how to sing, via their mirror-neurone system which they regularly use to learn choreography (Buccino, and Riggio, 2013).

“when I had a ballet demonstration,...it made it so much easier. And ...it made so much more sense to me because I could visualise it!” (Participant 12)

Participant 4 gave a description of her experience of the intervention:

“When you explained.. what it would look like in my head...it made me visualise it better... I could see a picture in my head. I can like see myself doing it and like, well then it almost feels like the same but not the same.” (Participant 4)

She described how she was able to compare motor-planning for ballet with the physical sensation of performing the vocal exercise which she experienced as similar, “the same but not the same” (Participant 4).

Participant 5 had less vocal experience but nevertheless found an improvement in her understanding of the exercise:

“Even if I can’t do it yet vocally, I still know what it’s meant to sound like just from picturing it with the arms for example” (Participant 5).

Her choice of words is interesting in that she mixes sensations and understands what the target sound should be like by “picturing it”. Participant 6 asserted that:

“Because you had the dance pictures in your head, in the exercises it made me change and adapt my body rather than just thinking about my throat and my voice” (Participant 6).

This implies external focus of attention which has been seen to facilitate motor-processes (Wulf, 2012; Leech, 2022; Chua et al., 2021). Participant 7 described how when the dance terminology was mentioned:

“I was picturing me in a ballet class in first position and second and fourth and it just, it made more sense to me. So, with the ones with the dance terms used, it was again, it was easier for me to like visualise.” (Participant 7)

Participant 10 suggested that visualisation and motor-planning were initiated by the intervention and this “actually helped” meaning that she perceived a difference in her singing when the intervention was implemented.

“When ...you were saying about arabesque and everything and I pictured in my mind but also the muscle memory of it...and I think when you are ...doing it, it actually helped...I could make the sounds better and easier.” (Participant 10)

Participant 11 felt the ballet terminology “helps you be able to ... imagine” and Participant 12 found that hearing ballet terms “really helped, being a dancer first, it made sense for me to like visualise it that way”. Participant 13 spoke of she could “physically imagine it in my head” combining senses in a similar way to Participant 5 to describe her experience, and Participant 14 found that;

“..imagining it in my head and then singing it, I think it made it a lot easier for me.” (Participant 14)

As predicted the inclusion of ballet terms was less effective for Participant 15 who was a first study singer. She stated, however, that:

“...it was effective” and that she was “imagining it as you were saying it and I could imagine how it would be.” (Participant 15)

Participant 15 commenced ballet training upon enrolment in college so it was notable that she was also affected by the intervention. Yamada, Itaguchi, and Fukuzawa, (2019) found that deliberate regular practice played a significant role in skills acquisition and ballet is timetabled 3-4 times per week at college. Participant 15’s questionnaire results revealed that she had similar knowledge of ballet terminology to the dancers. It is possible that this participant’s response to the ballet terms in the experiment was, therefore less surprising than supposed.

Participant 16 found that by focusing on the implied ballet manoeuvre she was able fill in gaps in her memory of the exercise:

“The imagery was going through my head of a rond de jamb, that really helped me to focus on the numbers (text). If you forgot the vocal terms or how you were meant to do it, you pictured the ballet move” (Participant 16).

Participant 16 later remarked that the intervention functioned as a “kind of safety net” for her memory.

Participant 17 found that the intervention made it:

“...so much easier with, you know, seeing like the dance terms and singing terms together. That made it so much easier for me to imagine what I was doing with my body.”
(Participant 17)

Her language is interesting (“seeing dance terms”) as there was no actual visual element to the exercise, only what was visualised by the participants. Participant 18 also found that visualisation brought on by hearing ballet terms, improved her experience of the exercises:

“I found it easier to be fair when you said the dance terms erm I think `cause then I could visualise something instead of just focusing on the singing. I think I could visualise what you meant.”
(Participant 18)

It seems that despite several of the participants recording negative Likert scales results for the intervention, all participants noted benefits in terms of visualisation including the singer.

Dance language initiates motor-planning.

As discussed, visualisation is evidence of motor-planning, and ballet terminology when incorporated into instructions for vocal exercises, initiated visualisation for the participants. They identified visualisation as useful for understanding exercises on a physical level, and implied that this was the missing element for them, in most singing lessons. Participant 1 expressed frustration at not being able to match the sound she imagined (audiated) her voice could make (GIML, 2024). The intervention, however, supplied missing visual and somatic information useful in motor-planning for singing.

“I feel like sometimes I just sing and I know how it should sound I just don’t know how to do it; ...when the imagery that was with it, it was easier to think ... how to control yourself, like even just the posture. I think that helped.”
(Participant 1)

External focus which has been seen to facilitate motor-processes (Wulf, 2012) and was initiated by the intervention, which additionally reduced anxiety, and possibly linked physical tension, which can be the result of ‘end-gaining’ (Alexander, 1923).

“I felt more comfortable when I was doing them because,... I was imagining it so it was something else to focus on rather than just thinking, ‘Oh my god, does that sound bad?’” (Participant 1)

Participant 3 spoke of the ballet terms helping to create a plan:

“I think it gave me a starting point whereas the others I was like kind of doing my own thing.” (Participant 3)

Participant 4 expressed surprise at the novel approach of the intervention, but realised the underlying implication of the ballet terms:

“It was kind of weird thinking of a like a tendu, like while I’m like singing, but kinda got me to realise like, OK like that’s the motion of it.” (Participant 4)

Her frustration was alleviated by more relatable instructions:

“If I don’t get it then... it’s frustrating but ...when you explained...I could see a picture in my head of ...myself doing the exercise and thinking, ok what muscles am I engaging.” (Participant 4)

Interestingly Participant 15, categorised as a singer, reported a negative response to one of the exercises finding that her normal breathing was impinged when a ballet term was included.

“I felt kind of clenched and grippy... (indicated midriff area) but I don’t know whether that’s just...ballet.. that’s how you’ve got to hold yourself?” (Participant 15)

Participant 15 perhaps only noticed tightness in her midriff because it was unusual for her, whereas dancers may well have experienced this as a normal sensation (Melton, 2015).

Participant 5 used dichotomous language to describe how the intervention provided a technical template for achieving more optimal vocal production.

“Like even if I can’t do it, I know that I’m doing it wrong whereas if I wasn’t thinking about the arms I probably wouldn’t know if I’m doing it or not.” (Participant 5)

In line with the findings of Glasheen (2017) Participant 5 asserted that breathing incorporated into choreography, aided her breath-management and externalised her focus, potentially optimising the motor-process (Leech et, al., 2022).

“If I know I’ve got to do a movement I’ll actually take a breath, whereas if I’m just told to take breath I will probably forget,... because I’ll be thinking about vocals.”

(Participant 5)

When asked how the language used in the experiment differed from ‘normal singing lessons’, the Participant 6 inferred a shift from end-gaining (Alexander, 1923) to process-driven learning (Vermunt, 1995) and thought this affected her singing.

“...a lot of the time you spend time talking about the sound you’re trying to produce or the placement, but actually we were focusing on what we were trying to do by body as well, ... which helped because you could picture what you were doing and it was affecting the sound...it meant you knew exactly where you were placing everything and somehow that made more sense than just thinking about your throat all the time and thinking about your face. You kind of were, replicating movements into sound which I thought really helped.”

(Participant 6)

The participants’ comments implied the intervention prompted an interweaving of visualisation and motor planning, several also implying a shift from internal to external focus.

Familiar dance language facilitates understanding of motor processes for singing.

Participant 1 speaks of an epiphany upon hearing ballet terms during the intervention, but identifies greater cognitive-load when ballet terms were absent.

“Like as soon as I heard the ballet terminology I was like ‘oh that’s it, I know what to do now!’ But when I didn’t have any I was like really having to listen to the instruction and like having to remember...”

(Participant 1)

Several of the participants mention dance language as instantly understandable to them on a somatic level and distinct from normal speech.

“Some of the ones where you didn’t give me a dance example didn’t like ..I tried to figure it out for myself, personally I’m not a very wordy person ..so when you said the dance terminology it just it made more sense to me.”

(Participant 7)

“...ballet terms...that’s what I have done my whole life so it makes it a lot easier to understand...” (Participant 3)

Participant 16 found that the implicit somatic information contained in the ballet terms aided understanding of exercises and experienced an increase of muscular as a result of the intervention.

“When you were doing like the legato one and using your port de bras, it helped me think, and I also think it helped you feel.” (Participant 16)

Participant 11 suggested that motor-planning for singing and was, for her, a novel idea:

“...it was like, helping to kind of think where I need to be I wasn’t used to like thinking about what I’m doing.” (Participant 11)

Participant 14 found that dance terminology “interlinked” the process of singing to familiar somatic patterns improving understanding of the exercise.

“So as soon as dance terminology comes into it, I’m like, ‘oh I can start to understand it more’ I think that was a big part of me understanding the exercise and where I need to go with my voice that all interlinked together.” (Participant 14)

Participant 11 had a similar view implying that the intervention was a useful link between the pedagogies of dance and singing:

“It helps you be able to ...imagine what it is you are supposed to be doing, like the sensation, I feel like to intertwine it with singing it does help.” (Participant 11)

Participant 9 experienced a revelation upon exposure to the intervention. Interestingly, she described language the researcher would use if not employing ballet terms, and identified this as less effective. In this way, it appears that not the teacher but the intervention itself that is effective.

“As soon as you said about the arabesque I was like, ‘oh that is kind of what everyone is saying when they are saying pull your shoulder blades down, the use of your abs’

that is the same as what you'd do in ballet. Just using the other words makes me relate the two things in my head.” (Participant 9)

Participant 13 noted that conditioned responses to ballet terms are common to dancers, requiring little cognitive effort because they have become automatic.

“I think I just physically imagine it in my head...because it's almost like for us dancers, it's like our spoken word,...because we've done it so much so I just instantly think about the position.” (Participant 13).

Participants comments imply that dance language communicates ideas to them on a deeper level requiring little conscious thought which, when linked to singing makes it relatable and quickly understood.

Familiar language positively affects effects mood

Throughout this paper, dancers' vocal anxiety and how it affects their college experience and potentially their earning capability post-graduation, has been discussed. At the earliest stages of coding their interview transcripts a word was startlingly re-occurrent, “comfort”.

“I actually really liked it because...it affected in a positive way. It was really different and I really enjoyed it!” (Participant 8)

Participant 14 was one of the more nervous singers but seemed to also enjoy the intervention.

“I was thinking of a ronde jamb and was like ‘ok focus’, so I think yea I liked that. I was a big fan of that!” (Participant 14)

A reduction in stress was also noted by Participant 5:

“When I'm thinking about dance I'm a bit more comfortable, so then I feel like the singing comes naturally.” (Participant 5)

Participant 12 said that although singing usually made her feel “vulnerable, when it's linked” with ballet terms she felt “more comfortable”. Participant 13 found that the intervention made her “happier” because it was “Really helpful”.

Participant 1 felt that her identity and skills were not always acknowledged by vocal practitioners, “I feel like sometimes singing teachers can be like ‘right we’re just singing I know you do your dancing but we’re singing’”, but the inclusion of dance terms were an acknowledgement of her identity and skills, effecting her feeling of connection to the teacher “it was like recognition that you can dance as well”.

This last comment, coupled with Participant 4’s, that dance language made her feel “seen”, demonstrate how using the language or phrases of others can be an acknowledgement of their identity; can demonstrate empathy; and can help to reverse the power dynamic of the classroom by empowering students. The inclusion of ballet terms appears to make the voice studio a “safe place” (Participant 10) where potentially improved competence brought about by visualisation, can turn an anxious situation into a pleasurable one.

Quantitative results discussed considering qualitative findings.

Participants could stand or sit during the experiment and participant 12, who had a negative result, remarked that she may have found the exercises less challenging in a standing posture, possibly more conducive to optimal singing. She went on to comment that the lack of feedback from the researcher was unsettling and this may have affected the other dancers, which is a sentiment echoed in the literature:

“Feedback validates our efforts. On the other hand, being ignored is painful”

(Mindyourstep, 2019)

Participant 12 additionally asserted that if she had not had a dance descriptor for the diphthong exercise, she would not have been able to attempt it. Other participants with negative scores considered the exercises difficult yet credited the inclusion of ballet terms with aiding their understanding of them:

“I found some of them really hard. ..I found it easier to be fair when you said the dance terms.”

(Participant 18)

Participant 2, was categorised as a triple threat but her score was only marginal positive. Her interview may perhaps shed light on why some participants were adversely affected by the intervention. She explained that she “was focusing so hard on these exercises that I didn’t fully understand” perhaps implying that the intervention added to her cognitive load as she was trying to achieve two separate goals rather than combining them. Cognitive Load Theory (Shibli and West, 2018; DeJong 2010) identifies this as inhibitory, because simultaneously attempting multiple tasks exceeds working memory capacity. Her unconscious assumption

may have been that the proficient execution the exercises was the end-goal (end-gaining) (Alexander, 1923; Vermunt, 1995). End-gaining is associated with perfectionism; therefore, this goal driven tendency could be common amongst dancers (Nordin-Bates, 2019). If Participant 2's focus was skewed towards a performance-goal, it may have inhibited conditioned motor-patterns for dance (Prasad and Mishra, 2019).

Some comments confirm that the scores may have been affected by inherent difficulties with singing, rather than by the intervention "I realised it's less about my skill... some of the exercises I struggle with... I just need to ..be less harsh on myself, on scoring myself" (Participant 8). Participant 14 remarked that, "giving it kind of a score, I'd find it challenging. For me the whole thing was challenging". Participant 17 had a negative result and said "it's difficult to retain everything as we went and I was trying to focus on what else you were doing" linking to Burden's (2004) findings that anxious students have divided attention, and to participant 2's comments. Upon reflection, however, she asserted that "I found it so much easier with, you know, seeing like the dance terms and singing terms together" which seems to contradict her scores. Despite the lack of statistical significance, the participants' experience of the intervention was mostly positive according to the interviews and one participant with a negative result said that she would revisit the intervention:

"I think it's something that I probably like to think about again while singing,...I do think It massively helped, I mean that." (Participant 12)

CONCLUSION

This research shows how language connected with ballet is experienced by MT students, who identify as dancers, in the context of the college voice studio. Participants found this intervention facilitated the understanding of the mechanics of vocal technique, by initiating visualisation and motor-planning. Additionally, the intervention reduced stress associated with singing lessons and was identified by the participants as an acknowledgment of their identity and skills, so that they feel 'seen'. Participants were interested in, and enjoyed the intervention saying that it helped them by adding a visual element to voice lessons which was considered an integral part of their learning process as dancers. They would welcome the use of the intervention going forward, in anticipation of actual technical improvements and enhanced confidence, associated with the use of ballet terms. In conclusion, despite the lack of statistical significance in research to support the use of ballet terms in the voice studio, participants nevertheless found the intervention beneficial in terms of visualisation and motor-planning.

Limitations

The small sample size of 18 participants, may have affected the size of the trend and Faber, and Fonseca, (2014) contend that it is vital to achieve a suitable sample size, as this can not only influence results, but also affect the validity and cost of a study. It is acknowledged that data was incomplete due to the absence of a submitted questionnaire from Participant 7, although the researcher made efforts were made to obtain the completed form. The varied content and difficulty of the exercises and the fact that several participants did not recognise the melody of Amazing Grace, affected how the exercises were scored in terms of difficulty by the participants. The researcher considered sending a recording of the melody to the participants prior to the experiment but rejected the idea as this would have allowed the cohort to practice, and may therefore have biased their reception of the exercise.

The initial invitations sent by the HOD received few responses. It was therefore necessary for the researcher to actively engage with the student population to encourage participation, therefore most of the participants had been taught by the researcher. Coyne, Grafton, and Reid (2016) found that a crucial factor for recruiting research participants was the building of a rapport, which is perhaps why explaining the research face to face had more impact in terms of recruitment, then a blanket email from the department head. It is acknowledged that this method of convenience sampling may have biased the research, however it also meant that the participants had expressed interest and were keen participants and were perhaps more likely to engage with the process. Two participants had experienced aspects of the ballet intervention prior to the experiment, but should not have been affected significantly, in that all of the exercises in the experiment were newly devised.

A focus-group could have been used initially, to ascertain participants' perceptions of voice lessons, and a post-experiment focus-group could have captured the cohort's experiences of the intervention. Scheduling difficulties were a factor of the research design, so this option was not pursued and as Guest et al. (2020) point out, similar data is usually obtained via these two methods. The overriding consideration of the researcher, was the necessity for each participant to be given equal time to communicate their reflections of the process, and as Leung, and Savithiri (2009) explain, focus groups can be influenced by the most vociferous participant. Sensitive information, perhaps relating to an individual's emotions and feelings of vulnerability, is perhaps more likely to be shared in the more private context of an interview (Schuster et al., 2023) Additionally, the chosen approach of post experiment interviews, allowed for convenient timetabling, so participants were not inconvenienced.

The decision to record participants' experiences rather than to measure and analyse acoustic output, is also perhaps a limitation of this study as participant observations are subjective. This decision was influenced by the researcher's pragmatic standpoint, as her overriding motivation was to make a positive difference to student experience in the voice studio. This was a small scale project with limited funding, so the use of ultra sound to measure a potential increase in muscular engagement as a result of the intervention, was not possible. Equally the cost and inconvenience of using an FMRI scan to measure neural activity during the intervention was prohibitive.

Future Recommendations

Repetition of the study to increase sample size, would perhaps influence the small trend seen in the quantitative results and Evanschitzky, et al. (2007) express concern that the number of replication studies is reducing, as new research is more likely to be published than iterative studies due to publishers' bias towards innovation (Kulkarni, 2013).

Moonesinghe, Khoury, Janssens (2007) agree arguing that the results of single experiments need to be verified and this can best be done by repetition. Fortunately, this current research was designed to be easily replicated in that the sample exercises were recorded so that experimental conditions may easily be reproduced.

An acoustic analysis to determine if the intervention improves projection, tonal colour or tuning would also be interesting, and was not explored in this research, as participant experience was prioritised. In future research studies, it would be valuable to gain a group perspective of the existing use of language in voice lessons and a focus group might engage participants in lively debate on the topic. It has been suggested that one participant's comments in a focus group can initiate responses from other participants causing an elaboration of ideas (Leung, and Savithiri, 2009). Use of FMRI and ultrasound to measure any physical and neural effects of the intervention, would require significant funding and might needfully be larger collaborative projects, requiring funding.

Reflection

During this project, I have had to develop my organisational abilities to manage my time efficiently and to manage every aspect of the experiment from designing the exercises, to coordinating participant availability. I have had to negotiate with department heads at college and learn to take on a more responsible and visible role, which as an introvert I have found difficult. Over the course of the MA my writing style has changed dramatically and my referencing skills have improved. Matters concerning IT have become less challenging

although I realise I still have much to learn in this regard. As a result of this project specifically, I have had to re-evaluate my teaching methods and their effectiveness. I have found that the participants preferred more specific somatic instruction, and that providing a learning rationale acts as both an explanation and motivation. I discovered that a visual element is frequently lacking in singing lessons, but that my student cohort are predominantly visual learners and need demonstration. I had not considered the impact of the language that I use in lessons, and how too much technical jargon can become a stressor for less experienced students. During the planning of this project, I tried to understand the viewpoint and experience of the participants, especially their vulnerability when they were being filmed in the experiment. I therefore designed the project so that I would become vulnerable myself, by handing the participants the power to evaluate my ideas and work. I became aware of the importance of acknowledging the identity and experience of my students and providing a safe space for them to explore their voices, views and artistry and to be 'seen'. Most importantly I had not realised how my students felt about me until they gave up their time to help with this research.

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