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Vocal health practice in the musical theatre rehearsal studio for students in tertiary training: Is there a need for a working document to be developed to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training?

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Proposal

Project title: Vocal health practice in the musical theatre rehearsal studio for students in tertiary training: Is there a need for a working document to be developed to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training?

Background/Context

For over fifteen years, the researcher has taught musical theatre (MT) singing as both an independent tutor and as a lecturer within tertiary education institutions. During this time, the observation of vocal health issues such as vocal fatigue, loss of higher vocal register, trouble projecting, voice strain and more, have been made apparent within lessons, often in connection to show rehearsals; this awareness was identified from anecdotal feedback from students, first-hand observation of vocal health issues in the rehearsal studio, and communication with other singing teachers who reported similar feedback. Technical vocal accomplishments that have been achieved under the researcher's tutelage, have been reported to have been discarded within the rehearsal process due to alleged difficult conditions within the rehearsal studio. Several factors have been anecdotally suggested to contribute to the negative vocal impact including:

- Volume of accompanying music
- Lack of vocal warm up/targeted exercises suitable for the repertoire being rehearsed
- Inexperience of singing with movement
- Length of rehearsal
- Lack of vocal health awareness

The recognition of these contributory factors and the impact on vocal health has prompted the researcher to focus on the potential of best vocal practice within tertiary education facilities for MT students.

Justification

After initial research, it was discovered that there is literature to support the researchers concerns for MT student vocal health. D'haeseleer *et al.* (2017) describes MT students as “a high-risk population for developing voice problems (such as overuse injuries) because of the heavy vocal load” (p.462-463). The literature review has discovered several causes that have been found to impact vocal health in MT students (to be discussed in the main part of this study), which potentially creates risk to an MT students' future career (Wanke et al., 2012; D'haeseleer et al., 2017). Moreover, current publications affirm that more research discussing the impact of vocal loading for MT students is required (Gaskill, Cowgill and Many, 2013; Donahue et al., 2014; Reckers, Donahue and LeBorgne, 2020; Zuim, Stewart and Titze, 2021, 2023). Therefore, this evidence supports the need to explore this topic to develop further understanding and potentially improve vocal health practice in the workplace.

Intended Impact

Existing research suggests that vocal demands for MT students can increase the potential for voice problems (Donahue et al., 2014; D'haeseleer et al., 2020; Reckers, Donahue and LeBorgne, 2020). Therefore, this research activity aims to see if there is a need for a working document to be created from the examination of effective rehearsal processes within MT training, with a view to making recommendations to those involved in the rehearsal process to avoid heavy vocal loading and ensure vocal safety; achieving best practice within the rehearsal studio. At this initial stage, the researcher believes best practice to be a combination of educating student understanding of vocal health, and to create an awareness, from all involved in leading the rehearsal process, of vocal health considerations. The idea of 'best practice' will likely evolve as the results from this study are retrieved and analysed, and will involve any measures needed to be put in place to safeguard student vocal health.

If conclusions suggest that a working document should be developed to work towards best practice in the rehearsal process for MT students in tertiary training, the wider ramifications for this project include the possibility of producing a working document that can be used by

anyone involved with student rehearsal processes.

Outlined intention

Paradigm: Due to the collection of both qualitative and quantitative data (mixed methods), the researcher will approach this project from a pragmatic paradigm (Mackenzie and Knipe, 2006; Feilzer, 2010; Creswell, 2014). Methodologies used will include both phenomenology and hermeneutics to focus on the "human lived experiences" (Wojnar and Swanson, 2007, p. 175) of both the researcher and the participants.

The **objectives** of the research are as follows:

1. Determine aspects of the rehearsal process which may be detrimental to vocal health and safety.
2. Expand understanding of vocal loading.
3. Analyse participant feedback with regards to the rehearsal process.
4. Explore elements of best practice which maybe applicable in the rehearsal process to safeguard vocal health.

Proposed methods

The study will be approached using mixed methods research (Johnson, Onwuegbuzie and Turner, 2007) to present a greater depth of comprehension and validity.

<u>Literature review:</u> The researcher will begin the process of the study with a narrative literature review (Efron and Ravid, 2019, p.21-22). The review will examine previous studies which focus on vocal loading amongst MT students and performers within the rehearsal process and training. Related topics will also include literature discussing rehearsal processes, vocal health, audibility, and current expectations within the MT industry.

Methods triangulation: Using triangulation (Schwandt, Lincoln and Guba, 2007) to strengthen the study's credibility, the researcher will use different methods of collecting data to check the coherence of findings; the use of surveys, interviews and a self-perception scale will be used to collect mixed methods of data. Foreseeing any potential issues in gathering enough data, snowball sampling (Berg, 2001; Denscombe, 2003) could be used to increase the sample size.

Survey: An initial survey (Creswell, 2014) will be carried out using an online survey generator (Qualtrics, 2024) to target anonymous MT student participants studying in tertiary education settings via social media platforms. Results from this initial stage of data collection will help frame the questions for the main interviews conducted in the rehearsal process.

Interviews: Semi-structured interviews (Gil et al., 2008) will take place before, during and after the rehearsal process to notice any vocal health changes during the various stages of show preparation. There will be a self-perception assessment of voice using a suitable rating scale conducted at each interview to produce quantitative data. The remainder of the interviews with participants will be video/audio recorded subject to participant consent (Berg, 2001) to form qualitative data. Recorded interviews will also be analysed using descriptive validity (Maxwell, 1992) where necessary, to ensure factual accuracy and transparency. Although face to face interviews would be preferred to support this idea, where participants do not agree to be recorded, they will complete an email interview (Opdenakker, 2006).

Data collection: Data will be analysed, transcribed, and coded (Erlingsson and Brysiewicz, 2018) to discover similarities/differences within the rehearsal process with links to vocal health. Once all data has been collected, theory/perspective triangulation (Panday and Patnaik, 2014) will be conducted; the findings will be compared to the themes that may have been identified in the literature review. Finally, the researcher will also use peer debriefing (Schwandt, Lincoln and Guba, 2007) by working with their tutor to offer greater perceptibility.

Expected timeline:

TASK	November /December 2023	January 2024	February - March 2024	March – May 2024	June/July 2024	August 2024	September 2024
Preparation							
Decide research topic							
Finalise aims and objectives							
Ethics form submission							
Write proposal							
Research							
Literature review							
Invite participants for initial survey							
Invite participants for main data collection							
Main data collection & interviews							
Report							
Complete introduction, literature review & methodology section							
Data analysis / complete report findings section							
Draft working document if data allows							
Draft submission							
Prepare presentation							
Report Submission							
Final presentation							

The ethics and insider research

Ethics: All potential risks to the participants, the investigator and the university have been considered when completing the ethics form (see Appendix A) and after submission, including a self-permission letter (see Appendix B), ethics approval has now been granted by the University of Wales Trinity Saint David.

Boundaries: The researcher is aware of the risk of breaking boundaries (Pandey and Patnaik, 2019) due to the topic of vocal health addressed in this study. Therefore, when communicating with participants, no vocal health diagnoses will be suggested. Alternatively, information about where to receive ongoing support will be offered should participants have concerns about their vocal health.

Insider research: As an insider researcher, this study allows the investigator "possibilities for autonomy and empowerment" (Costley, 2006, p. 1) leading to the ability to challenge existing conditions in a workplace from a knowledgeable viewpoint (Costley, Elliott and Gibbs, 2010). This understanding of the research topic will create a relatability between the researcher and the participants. Studies published suggest that subjectivity causes potential bias which can lead to questionable conclusions (Saidin and Yaacob, 2016). Moreover, important evidence can also be overlooked that may not seem meaningful to the insider researcher, yet an outsider might deem that same data as critical information (Costley, Elliott and Gibbs, 2010; Saidin and Yaacob, 2016). The researcher aims to mitigate this possible bias in the following ways:

- Using pre-approved scale material.
- Main interview questions will be formed using initial survey results.
- Ensure participants do not train at the investigators workplace by using snowball sampling rather than convenience sampling (Berg, 2001; Denscombe, 2003).
- Negative case analysis (Schwandt, Lincoln and Guba, 2007; Panday and Patnaik, 2014) will be implemented to ensure all data is presented.

Personal learning outcomes:

1. Gain a broader understanding of the rehearsal process in MT training within tertiary education.
2. This project will enable the researcher to learn the processes of collecting and analysing data via surveys and interviews.
3. Identify other potential areas of research to consider in the future as a PHD candidate.
4. Should the project successfully allow the proposed working document to be created, the researcher hopes this would increase their employability in a more senior role within higher education institutions.

The Report

Project title: Vocal health practice in the musical theatre rehearsal studio for students in tertiary training: Is there a need for a working document to be developed to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training?

Introduction

Vocal health concerns for students studying musical theatre (MT) in UK tertiary education establishments provides the focus of this report. As an experienced vocal coach, singing teacher and lecturer, working mainly with MT students aged 18 – 25 years old within training institutions, the researcher's current primary role is to deliver singing and voice classes to students studying MT at undergraduate degree level. Previous research studies regarding MT education, have focused on cross training needs for MT singers to cover the array of stylistic demands needed in today's industry (Greschner, 2019). This research supported work within the singing classroom, where there is a degree of control over the content and context of the work carried out. This current study reflects the belief that the topic of vocal health amongst this student cohort, specifically in relation to the show rehearsal process, needs to be addressed to begin to create awareness of best vocal practice to mitigate potential vocal health issues in an attempt to prevent vocal damage; the concept of 'best practice' consisting of the combination of educating student understanding of vocal health, and raising the awareness of vocal health considerations from all involved in leading the rehearsal process. This concern is a result of both previous and current anecdotal feedback from MT students and staff, who often report additional vocal challenges for students within rehearsals, such as:

- Rehearsal length and vocal fatigue
- Lack of vocal warmups and cool downs
- Difficulty combining singing and dance
- The inability to hear their voices above the music

This apparent rehearsal environment has been witnessed by the researcher on several occasions, and within multiple training institutions. In agreement with Glasheen (2017), personal observations support the suggestion that there appears to be a “pedagogical divide” (p.20) within MT training whereby teachers may work independently to deliver their specialist area of study (singing, dance, or drama) perhaps without consideration, or thorough understanding of the supporting disciplines and how they may work in unification. Moreover, there are several reports in the literature addressing vocal health for MT singers suggesting that further research is needed to advance understanding of the topic with an aim to improve vocal health practice within MT education (Gaskill, Cowgill and Many, 2013; Donahue et al., 2014; Reckers, Donahue and LeBorgne, 2020; Zuim, Stewart and Titze, 2021; Zuim, Stewart and Titze, 2023).

There are potential career risks for MT students who face demands which are “highly exhausting, physically and vocally” (Paulino, Simões-Zenari and Nemr, 2021, p.4). Consequently, this study aims to support future MT performers by determining if a working document which would support best vocal practice in the rehearsal process for MT students in tertiary training needs to be created, to improve the student experience of the rehearsal process and further educate those involved such as visiting directors, musical directors, and choreographers who may not specialise in the voice, to consider ways to support vocal health within rehearsals. A working document could include advisory vocal health measures to be in place during rehearsals, and beyond the scope of this study, it could be further developed via practitioner input, using an approach such as the Delphi method (Loo, 2002) (see Appendix C). This could be a useful approach to help create effective strategies within an MT training institution whereby individual practitioner input and student feedback could help contribute to a working document.

The data retrieved from this study hopes to inform what potential vocal health measures can be put in place for the MT student show rehearsal process and it aims to confirm whether or not there is a consistent level of understanding across a small population of MT students with regards to vocal health, and potentially provide the basis for improved rehearsal process design. This project aims to provide further understanding of the MT student rehearsal process within tertiary education and it is broadly hypothesised that personal concerns about vocal health may be reflected in the data collected via student perspective regarding their rehearsal experiences. However, this data could also provide

new, or opposing information, which will develop further comprehension of the topic. As a result, the data will be paramount in the creation of a proposed working document to support both students and MT rehearsal leaders (the term 'rehearsal leaders' will be used in this report to include anyone involved in the show rehearsal preparation such as the visiting directors, musical directors, choreographers, and faculty tutors). This information has the potential to be distributed within the wider field of MT education to create a correlative rehearsal practice with regards to vocal health. In addition, the development of research skills will be increased significantly due to the project being the first of the course modules in which the researcher has collected data. There is hope that the results of this project will identify new areas of research to be considered for a potential academic role as a PHD student. At the conclusion of the project, it is hoped that the results will inform teaching practice moving forward and may support progression into a more senior role within the industry where the concluding knowledge can be delivered to the wider population of MT students and tutors across UK tertiary training establishments.

Literature review search criteria

The narrative literature review began by searching for published research which focused directly on MT student vocal health and MT student singing demands. Due to a limited amount of research specific to this area (D'haeseleer et al., 2017; Paulino, Simões-Zenari, Nemr, 2021), the review was then extended to include studies investigating MT singers out of education and any other research which had been carried out addressing the broad topic of vocal health for singers to support the rationale. Subsequently, the literature review was divided into four sections:

1. Papers which studied MT student participants
2. Papers which studied MT singers (professionals/amateurs)
3. Papers which addressed other types of singers (not MT)
4. Any other relevant papers

Within these four sections, three main relevant topics of discussion were identified and are discussed further below:

- MT show rehearsal demands
- MT education
- Additional factors - on stage and off stage

Literature review

Introduction

It is essential to prepare MT students sufficiently for a long-standing career as an MT performer which requires a substantial vocal load (D'haeseleer et al., 2017). MT performers have been described as “triathletes” (Wanke et al., 2012), a performer who has the challenging task of managing the combination of singing, acting, and dancing. Research has found that this population of performers are susceptible to developing voice disorders (Pacheco and Behlau, 2019; Paulino, Simões-Zenari and Nemr, 2021; Suddeth and Flynn, 2022), which will be discussed in further detail throughout this review. Therefore, it is important to minimise risks such as a vocal injury, or any issue that may occur because of inadequate vocal health training that could have significant ramifications on their career (Wanke et al., 2012; D'haeseleer et al., 2017). By looking specifically at what vocal demands are expected in the MT rehearsal process, it is possible to gain a more comprehensive perspective of the requirements MT performers encounter in the rehearsal studio and how the creation of working document could support this process.

MT show rehearsal demands

Each of the following MT show rehearsal demand sections corresponds with the initial MT rehearsal concerns identified within the project introduction.

Length of rehearsal & vocal loading

MT professionals and students are often required to engage in long rehearsals with heavy vocal loading (D'haeseleer et al., 2020); vocal loading referring to a measure of vocal function which Phyland *et al.* (2013) describes as the “intensity, frequency, and duration” (p.390.e.32) of using the voice. Zuim, Stewart, and Titze (2021) describe the MT rehearsal process as “physically, vocally, and emotionally demanding” (p.1), an initial concern for the researcher. Moreover, it has been acknowledged that the combination of long hours and

vocal demands can create “dangerous working conditions for the voice” (Suddeth and Flynn, 2022, p.2).

In 2021 and 2023, Zuim, Stewart and Titze created two studies which assess MT students within the rehearsal process. Both studies collected data using dosimetry to assess up to four types of vocal dose employing a dosimeter device (see Figure 1) which measures vocal fold vibration (Gaskill, Cowgill, and Many, 2013). The four types of vocal dose are outlined as follows:

> Time dose...the accumulated duration of phonation, cycle dose...the number of vibratory cycles accumulated in this duration, distance dose is the cumulative excursion of the tissue particles in their oscillatory trajectory, and dissipated energy dose is the energy dissipated by tissue particles rubbing against each other (Zuim, Stewart and Titze, 2021, p.2)

Figure 1. Dosimeter calibration with external microphone and guide (Zuim, Stewart and Titze, 2021, p.3)

In 2023, the dosimeter device was attached to five students during four, three-hour

rehearsal periods for the musical *Nine* (Yeston, 1982) at various stages of the rehearsal process and showed “variability and unpredictability of the rehearsal process regarding vocal demands” (Zuim, Titze, Stewart, 2023, p.3). In 2021, they monitored six MT students preparing to perform in the contemporary musical *Wonderland* (Wildhorn & Murphy, 2009) who were similarly assessed but for eight hours at various stages of the rehearsal process, along with a self-perception scale (used at the end of each monitored rehearsal) and demographic questionnaire. The questionnaire also provided useful information such as the assigned roles the students were playing, which could prove useful in this project to further understand vocal demands. Zuim, Titze, and Stewart (2023) conclude that future studies should include using dosimetry information and self-evaluation of vocal fatigue which would be beneficial and help reduce vocal injury. Although, this current project is not a clinical study and will not include dosimetry due to research limitations, the methods and design of these two studies provides insightful information for the researcher and has influenced the study design to include observations throughout the various stages of the rehearsal process and in addition use the self-perception scale EASE - Evaluation of Ability to Sing Easily (Phyland et al., 2014a), to be discussed further in the methods section of this report. Findings from using these methods could help determine if a working document should include considerations to reduce vocal loading.

Vocal warmups /Cool downs

The researcher had an initial concern that MT student rehearsals lacked an efficient warmup and cool down practice. Moreover, the content of each MT rehearsal cannot always be foreseen and may require “unpredictable amounts of singing and speaking” (Zuim, Stewart, and Titze, 2023, p.12) therefore, the importance of preparation cannot be overlooked. Vocal warmups are said to “increase muscle flexibility and efficiency as well as positively affecting the overall vocal quality” (Reckers, Donahue, and LeBorgne, 2020, p.856). Gish *et al*. (2012) state that vocal warmups are a preventative measure to avoid vocal injury. In their study which analysed vocal warmup practices, multiple warmups including physical and vocal exercises (see Figure 2) were suggested to be effective and they concluded that warmups should take between five - ten minutes.

Suggested Vocal Warm-Up Regimen	
Duration	5–15 min (56%)
Nonsinging exercises	1. Stretching exercises targeting the face/head/neck muscles (62%) 2. Breathing exercises (55%) 3. Postural alignment exercises (50%)
Singing exercises	1. Five-note scale (52%) 2. Octave scale (32%) 3. Arpeggio, legato (25%) 4. Glissando (21%)

Number of participants: 117.
Percentages are based on participants' responses; for singing exercises, only "always" responses are used.

Figure 2. Suggested vocal warm-up regimen (Gish et al., 2012, p. e9)

However, they also noted that only 54% of their participants always completed a vocal warm up before singing and only 22% used cool downs. This found data reflected the initial concerns that a high number of students are not warming up and cooling down sufficiently for show rehearsals and highlights the need for warmups and cooldowns to be included in a working document.

Combination of singing and dancing

The combined task of singing and dancing, which is an expected demand as an MT performer (Hagen, Kvammen and Lessey, 2018) was an initial concern of this report. Paulino, Simões-Zenari and Nemr (2020) suggest that combining singing and dancing for the purposes of MT performance "presupposes physiological effects" (p.2) that need to be understood to protect the career of the performer. The activity of singing and dancing can lead to dehydration caused by a raised body temperature (Pacheco and Behlau, 2019) which is believed to cause ""dry" and "sticky" vocal folds" that "do not oscillate as easily as

wet and “loose” vocal folds” (Alves, 2017, p.2).

A further study regarding the combination of singing and dancing as a final year MT student was conducted by Stephens and Wyon (2020) who found that either of the two disciplines is compromised when having to perform both in combination. Even when not performing the tasks simultaneously, results indicated that the frequency of breathing is reduced after a dance combination is completed due to the continued demand to sing, therefore having a negative impact on recovery. They emphasise the need for choreography to be sympathetic to the needs of the performer (Morton, 2014) and note that lead singers often receive decreased levels of complexed and demanding choreography in the professional industry due to their vocal demands. However, the complexed task for the ensemble cast, can lead to a weaker performance of one of the two disciplines. The study did not conclude if the training students received needed to be improved or had trained them sufficiently for the tasks, not that this was this the studies purpose, however, it did prove to produce interesting quantitative data to substantiate the physical impact of this MT performer demand.

Additionally, Sliiden, Beck, and MacDonald (2017) note that singing and dancing simultaneously can compromise the quality of the performance output of both tasks as MT singers can also experience additional challenges with breathing when dancing concurrently (Paulino, Simões-Zenari and Nemr, 2018). Moreover, Glasheen (2017) and Sliiden, Beck and MacDonald (2017) state that the ability to merge the disciplines together is not taught sufficiently within MT training and more research is needed in this area to help MT performers manage this prodigious task. Therefore, a working document could consider how the combination of the two disciplines are delivered to better support students in their training.

Audibility

The inability to hear the student's own voice above the volume level of the musical accompaniment was identified as an initial concern leading to additional vocal effort during MT show rehearsals. However, a review of the available studies reveals a gap in the research addressing audio configuration within MT rehearsals. Therefore, this study

suggests that more research needs to be carried out to consider the impact of un-amplified voices within rehearsals, which could conclude similar findings to Venkatraman, Brinton Fujiki, and Sivasankar (2021), who discuss the issue for fitness instructors, stating:

> ...repeated high phonatory doses can increase potential for long-term laryngeal tissue damage...laryngeal inflammation and self-reported laryngeal discomfort have been reported following vocal loading tasks of comparable background noise and duration (p.805.e13).

It could be argued that MT performers experience similar studio environments in that they both need to project their voices over the music whilst being physically active and Rumbach (2013) who explored voice issues amongst group fitness instructors, states that some use microphones to help combat this problem. Additionally, research has determined that group fitness instructors have a high prevalence of voice problems (Venkatraman, Brinton Fujiki and Preeti Sivasankar, 2021). However, in the MT rehearsal process, it is the experience of the researcher that microphones are only added into practice during technical rehearsals, towards the very end of the process. Yet, when performing in live shows, MT performers have the support of electronic amplification (Echternach et al., 2014). Due to the lack of microphone support in rehearsals, this arguably creates an experience of the Lombard effect (Vinney et al., 2016), whereby MT performers will increase their vocal loading due the struggle of being heard over the music within the rehearsal studio, which could possibly lead to additional vocal fatigue and potential vocal injury (Venkatraman, Brinton Fujiki, and Sivasankar, 2021). Therefore, the researcher suggests that audibility issues need to be addressed for students in the rehearsal studio in a working document to protect them from vocal injury.

Considering the above elements of the rehearsal process for concern, it is essential to investigate how MT education courses are preparing students for the industry by looking at the delivery of vocal health education.

MT education

MT training courses are known to be intensive as students work on all three aspects of

performance (D'haeseleer et al., 2017), and as well as combining movement with song, MT singers have to be adept in a multitude of singing styles including traditional MT, contemporary MT, legit and pop/rock (Freeman, Green and Sargent, 2015). In agreement with Paulino, Simões-Zenari and Nemr (2021), there is a concern for students who are expected to demonstrate a variety of vocal styles "as they are highly exhausting, physically and vocally, and it is essential that teaching takes place efficiently and safely" (p.4). For MT students to achieve a long-standing career in the industry, early intervention within their training is key, and Wanke et al. (2012) suggests improvements within MT education could help prevent vocal injury. However, in 2019, Zuim *et al.* studied the vocal educational backgrounds of singers (of which, a sizeable proportion were MT singers) and suggested that the vocal education background of professional singers is varied and therefore, understanding of vocal health within the industry is disparate.

Gaskill, Cowgill, and Many (2013) state that within rehearsals "students are typically on their own in learning how to pace themselves vocally" (p.11). Therefore, it is essential they receive specific training to understand what can affect their vocal health, as Moniz (2022) states, "one's ability to regulate vocal load in high impact production is directly related to the potential risk of vocal injury" (p. 606). In addition, MT performers will not only be singing but may also using their spoken voice if they have dialogue, which stage actors also need to consider ensuring "optimal voice production" (Rangarathnam, Paramby, McCullough, 2017. p.1), as use of the speaking voice both in and out of rehearsals may add to any vocal fatigue students may be experiencing.

Suddeth and Flynn (2022) assessed the experience of undergraduate students in performing arts training programmes. Using an online survey, they were able to collect information directly from students who suffered with vocal injury, relating to the student/teacher relationship, faculty support, and the impact of their injury upon their course results. They concluded that performing arts training programmes needed to "do better by their students" (p.8) and highlighted the significance of the communication between student and teacher, and amongst faculty members. This provides additional support for a potential working document to be created to encourage better relationships within MT training institutions to gain student opinion of whether they feel they can communicate easily with rehearsal leaders about vocal health and if they feel they receive adequate support.

An additional study which has proven that a self-perception rating scale and questionnaire would be useful to discover more about MT education is by D'haeseleer *et al.* (2017), which determined voice qualities in MT students over the period of a year, concluding that there should be screening for MT students voice at the start of their programme and at intervals throughout. This may prove a useful process, which has not personally been encountered in any workplaces, and a consideration for a working document. Also, Phyland *et al.* (2013) assessed MT professionals used the Singing Voice Handicap Index (SVHI) along with thematic analysis of focus group interviews and surveys to gather perspectives on vocal health and function. As an earlier study, it suggested that it was the first of its kind to represent "actual lived experiences" (p.390) of MT students and gathered both negative and positive perceptions of the voice from participants. Gaining this type of data, would prove useful in further understanding current MT student experiences.

Additional factors

As well as the highly demanding performance tasks placed upon MT performers already discussed, there are also additional factors that could have an impact on their vocal health. These can include both on-stage and off-stage behaviours:

- On-stage – Stage effects such as smoke, restrictive or heavy costumes and insufficient sound support (D'haeseleer et al., 2020).
- Off-stage – Stress and social activities (Suddeth and Flynn, 2022, p.2).

Roll and Goffi-Fynn (2021) discuss several additional factors with Broadway MT professionals using semi-structured interviews which included discussion of their background, vocal maintenance, and tour life. Although, this study focused on experienced MT professionals, it provides information that is useful to consider, specifically the "lack of routine" (p.681) that impacts emotional health. For MT students, the show rehearsal process often differs from their regular timetable and therefore, this additional factor of change in routine could potentially have an impact on students due to unprecedented rehearsal demands such as longer hours of practice, the learning and repetition of staging, choreography, and vocal demands of singing and spoken dialogue (Zuim, Titze, Stewart,

2023).

Finally, Donahue *et al.* (2014) published a ten-year study (2002 – 2011) which not only included the discussion of both practical performance issues for students, such as vocal problems/symptoms, practice, and performance but also additional factors such as allergies, training experience, and health factors such as smoking habits, medication subscription, the female menstrual cycle and hydration. The results were based on questionnaires completed by first year undergraduates studying MT. This study was completed over 10 years ago; therefore, based on more recent literature, personal observations, and student perceptions, the researcher suggests that although issues were found, practical solutions do not appear to have been put into practice within MT student studios on a broader scale. Additionally, MT trends are continually changing; in the last decade there has been an increase in pop/rock musicals, requiring singers to incorporate contemporary commercial music (CCM) skills (Edwards and Hoch, 2018), and even opera companies have started to include musicals into their production schedule due to a growing trend in more popular styles of theatre (McQuade et al., 2018). Hence, the need for updated research that reflects the current industry demands.

Summary

Although this literature review is promising in that vocal health research is being carried out to study the MT population of singers, the latest research addressing MT students in rehearsal concludes that researchers are “yet to establish a safe baseline vocal dose for singers” (Zuim, Titze, and Stewart, 2023, p.13). With this in mind and based on the data found in this literature review, the researcher believes there is potentially a need to for a working document to suggest recommendations to protect the vocal health of MT students in the rehearsal process. Factors to consider at this stage are included in the Figure 3.

Results from this practical research project will conclude if the findings align with current literature data and determine if there is a need for a working document to be developed to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training.

3 x literature topics of interest	Working document topic ideas
MT show rehearsal demands	Rehearsal length • *Vocal loading* • *Vocal fatigue* Rehearsal preparation and recovery • *Vocal warmups* • *Vocal cool downs* Addressing the ability to combine singing and dance • *Teaching delivery* • *Student knowledge* Audibility awareness and practical solutions • *Student awareness* • *Rehearsal lead awareness*
MT education	• Preventing vocal injury • Vocal hygiene
Additional factors - on stage and off stage	• Teaching delivery • Student knowledge

Figure 3. Elements of research design from literature review findings

Methods

Research paradigm and methodology

Due to the collection of both qualitative and quantitative data, this project will be approached from a pragmatic paradigm to support a mixed methods approach (Johnson, Onwuegbuzie and Turner, 2007; Feilzer, 2010). The decision to use this paradigm is due to adding quantitative data to add validity, however, there may be a need to adapt methodological approaches depending on the initial survey responses. A constructivist approach was also considered, which supported the idea of obtaining the thoughts and understanding of vocal health practice from MT students through qualitative data

(Creswell, 2014; Constantinou, Georgiou and Perdikogianni, 2017). However, the paradigm needed to include an objective standpoint to add rigour, associated with positivism (Guba and Lincoln, 1994), as it could have proved subjective if only thematic analysis was used (Braun and Clarke, 2006). Therefore, the methodology chosen will include both phenomenology and hermeneutics to focus on “human lived experiences” (Wojnar and Swanson, 2007, p.175).

Overview

To strengthen the credibility of the study, methods triangulation (Schwandt, Lincoln and Guba, 2007) will be achieved using surveys (Creswell, 2014), semi-structured interviews (Gil et al., 2008) and a self-perception scale (Phyland et al., 2014a) to collect mixed methods of data. This data will be transcribed, analysed, and coded (Braun and Clarke, 2006) to investigate the MT rehearsal process.

Participants

Participants were selected via purposive sampling and snowball sampling (Berg, 2001; Denscombe, 2003). The information to take part was initially shared via email and social media platforms (see Appendices D, E, and F) and it was subsequently shared by personal contacts and the public to a wider demographic. The inclusion criteria included the need to be aged 18 – 25 years old and studying full time MT at undergraduate level within the UK. The decision to collect data from students alone and not to use a triangulation of sources, such as seeking the additional views of rehearsal leaders within tertiary education settings was due to the following factors:

- This topic of this study was created due to student experiences of the rehearsal process within tertiary education establishments which had been witnessed first-hand in the researcher's teaching career.
- The teaching of singing is not a regulated profession, therefore, the researcher does not believe that it is fair to expect all MT rehearsal leaders in tertiary education to have absolute knowledge of vocal health.
- Before approaching rehearsal leaders with concerns, the researcher hoped to find data to support opinion that there is reason for reflecting on current show rehearsal procedures.

Due to the scope of the study, the aim was to have approximately ten participants for the survey; the final number of participants reached twenty-six. At the end of the survey, participants had the option to contact the researcher to express interest in the interview process which had the same inclusion criteria as the survey. Three participants agreed to take part in the interview process and complete a rating scale (see Appendix G).

Literature review

Prior to conducting surveys and interviews, a comprehensive narrative literature review (Efron and Ravid, 2019) was conducted. The review examined studies which had focused on the vocal health of MT students, vocal health for MT performers (professional and amateur), vocal health studies for singers (regardless of the genre), and other supporting studies found by citation mining (Colavizza and Romanello, 2019). The findings from the review helped inform knowledge and understanding of the topic and develop questions to be used in the survey.

Surveys

The initial survey (see Appendix H) was created via an online survey generator (Qualtrics, 2024). Purposive and snowball sampling was used to ensure a significant sample size by sharing the link to the survey on social media. The survey consisted of both closed questions to form quantitative data and participants were given the opportunity to provide additional information to “explain further” in some questions to form qualitative data. Both forms of answers informed the question design for the main interviews.

The survey was designed to take between than five – ten minutes to complete and included twenty-three questions focusing on student observations of the MT rehearsal process. It included the following topics:

- Vocal demands
- Vocal warmups/cooldowns
- Combination of singing and dancing
- Voice rest
- Voice quality

- Use of microphones
- Costumes
- Vocal fatigue
- Vocal health knowledge
- Vocal hygiene
- Length of rehearsals
- Student/director rapport
- Vocal diagnoses

These topics were chosen to include the four initial concerns previously stated (rehearsal length and vocal fatigue; lack of vocal warmups and cool downs; difficulty combining singing and dance; the inability to hear their voices above the music) and any other topics that appeared within the literature review research.

Interviews

As a means of analysing the MT student rehearsal process in its entirety, three semi-structured interviews took place in the early stages of the rehearsal process (see Appendix I), at the mid stage of the rehearsal process (see Appendix J), and finally, after the participants had performed in their final show (see Appendix K). The first two interviews comprised of seventeen main questions and the final interview had sixteen main questions. The questions were refined after consultation with the project mentor to ensure interview questions were open rather than closed, and additional prompts were added when necessary if the respondent's answers prompted further explanation.

The interviews were conducted via the communications platform, Zoom (Zoom, 2023). Each interview was video recorded which was transcribed using Otter.ai (Otter.ai, 2024) to create qualitative data and analysed using thematic analysis (Braun and Clarke, 2006). To further enhance research rigour, descriptive validity (Maxwell, 1992) was used to ensure transparency and factual accuracy. Before each interview, participants were required to complete the Evaluation of Ability to Sing Easily (EASE) self-perception scale (see Appendix G).

Self-perception scale

There are a number of suitable rating scales that could have been chosen for this project including VHI (Singing Voice Handicap Index) (Rosen and Murry, 2000), CAPE-V

(Consensus Auditory Perceptual Evaluation – Voice) (Kempster et al., 2009), and the DRSP-MTA (Dysphonia Risk Screening Protocol for Musical Theatre Actors) (Paulino, Simões-Zenari and Nemr, 2021). After researching the validity and function of suitable rating scales, the final choices were the Evaluation of Ability to Sing Easily (EASE) (Phyland et al., 2014a), and the Dysphonia Risk Screening Protocol for Musical Theatre Actors (DRSP-MTA) (Paulino, Simões-Zenari and Nemr, 2021). Both scales have been used to assess the MT singing voice, and although Paulino, Simões-Zenari and Nemr (2021) concluded in their study that the Dysphonia Risk Screening Protocol was "feasible and easy to apply" (p.1), the decision was made to use the EASE scale, as in agreement with Phyland *et al.* (2013), it is "simple, quick to complete, easy to score, and useful" (p.454). By choosing this rating scale, the researcher hoped to avoid anyone withdrawing from the research due to time constraints due to their demanding rehearsal schedules. The EASE scale was developed in 2013 (Zuim et al., 2019) and indicates an immediate evaluation of the voice at the current time of completion. It includes twenty-two items (Vella, Brown and Phyland, 2021), with nineteen negative statements and three positive statements which are reverse scored, and the items are also formatted as three sub-scales (see Figure 4) which address vocal fatigue (VF), pathologic-risk indicators (PRI) and vocal concern (VC). Phyland *et al.* (2014b) states that the scale is useful to track changes in the voice across time, therefore, this tool was found to be suitable to assess the participants and the start, middle and end of the rehearsal process to compare the perceived effects of vocal loading at different points in time.

Comparison or individual progress

The was an option for the EASE self-perception rating scale scores of the three participants to be statistically compared. However, with such a small number of participants, this did not appear to be the strongest idea to ensure validity (Berg, 2001). Instead, the scores were compared on an individual basis, considering the scores as both a linear progression from the start to the end of their rehearsal process, a process that is supported by Phyland *et al.* (2014b) who suggests "EASE shows promise for tracking the perceived immediate, short-term and long-term effects of working as a music theater performer" (p.107), and comparing the individual statement scores with their interview answers to gain further understanding of the self-perception of their voice.

VF	PRI	VC
My voice is husky	My voice cracks and breaks	I am worried about my voice
My voice is dry/scratchy	My voice is breathy	I am concerned about my voice
My throat muscles are feeling overworked	I am having difficulty with my breath for long phrases	
My singing voice feels good[a]	My voice is cutting out on some notes	
The onsets of my notes are delayed or breathy	I am having difficulty singing softly	
My voice feels strained	I am having difficulty changing registers	
My top notes are breathy	I am having difficulty with my high notes	
My voice sounds rich and resonant[a]	Singing feels like hard work	
My voice is tired	I am having difficulty projecting my voice	
My voice feels ready for performance if required[a]	I am having difficulty sustaining long notes	

[a] Reverse-scored.

Figure 4. EASE items according to subscale (Phyland et al., 2014b, p.103)

Analysis

Theory/perspective triangulation (Panday and Patnaik, 2014) was conducted once all data was collected; the results were compared to topics of interest identified in the literature review. Finally, peer debriefing (Schwandt, Lincoln and Guba, 2007) with a university mentor was used to provide improved perceptibility.

Methods discarded

Journals

It was an ambitious task to add participant journals into this study. This was a method the researcher hoped would enhance the validity of the data, adding additional information from the participants from within their rehearsals. The method of using data was dismissed for three reasons:

1. Minimise the risk of participants withdrawing from the process. Asking one participant to complete three interviews, three self-perception scales and a reflective journal would potentially be too much to ask of a student who is in an intensive training programme.
2. There was also a risk of protecting their recorded data; any recordings or written diaries could be accessed if lost or stolen.
3. Due to the scope of the study, the extensive task of analysing journal data as well as survey results and interviews would not be possible within the time or word count allowed.

Workplace study

At the start of this study, the researcher's working career within tertiary education was on hold due to an upcoming change in position within higher education, therefore, it was necessary to recruit outside of the personal professional working environment. This meant that any considerations of research within the workplace was not an option at the time. Data gathered within one institution could have had the potential to reveal results similar to the studies carried out in 2021 and 2023 by Zuim, Titze and Stewart, where students were taking part in the same rehearsal process, thus, offering a perspective that could have provided immediate benefits in the researcher's workplace by offering practical solutions to improve vocal practice. However, it could also have caused potential bias and subjectivity by overlooking critical information that might be unnoticed by an insider researcher yet seems important to an outside investigator (Costley, Elliott and Gibbs, 2010; Saidin and Yaacob, 2016).

Member checks

Member checks (Shenton, 2024) could have enhanced transparency. However, the brief period allowed to complete this project may not have allowed for extra communication between investigator and participant and therefore, other methods of research rigour were chosen.

Ethics

Ethics approval was granted by the University of Wales Trinity Saint David (UWTSD) (see Appendix A). Following this, the University's ethics policies, guidelines, and codes of practice were considered, ensuring the researcher always conducted themselves in a professional manner. Further considerations included:

- Data protection: This included risk to the university and the investigator's data being accessed and shared, which in turn affects the participant's personal information and contributions being accessed. This was mitigated by securing password protected files on a password protected computer and ensuring all participants were anonymised. All data will be destroyed upon course completion.
- Pressure to participate: Survey participants signed a consent form (see Appendix L) before submitting the survey and before beginning the survey they were told they

could withdraw at any time. Interview participants also signed consent forms (see Appendix M) to be made aware from the start of the interview process that there would be no repercussions should they wish to withdraw from the study at any stage.

- Insider research and bias: There was risk of bias due to the personal knowledge and opinions of the topic which could potentially create an interest in proving the researcher's opinion as factual. However, this was mitigated by working fairly and impartially by analysing the data from an unbiased perspective using the following methods:

    1. Using pre-approved scale material.
    2. Initial survey results informing interview questions.
    3. Negative case analysis (Schwandt, Lincoln and Guba, 2007; Panday and Patnaik, 2014) will be executed.
    4. Purposive and snowball sampling will be chosen over convenience sampling (Berg, 2001; Denscombe, 2003) to seek participants who are not tutored under the researcher's guidance.
    5. The project was not carried out within the researcher's workplace, therefore, all bias in this regard was mitigated.
    6. Include reflection on action and reflection in action (Schön,1983) when necessary.

- Boundaries: The discussion of vocal health with participants could have caused the boundaries of the topic to be broken (Pandey and Patnaik, 2019). Therefore, information was presented on the survey consent form about where to receive support should anyone have vocal health concerns. Within interviews, if the respondents answered the final question which would ask if they had any vocal diagnoses at present with “Yes”, the same advice would have been given.

Research Timeline

What	When	Where	With Whom
Narrative literature review	Nov 2023 – March 2024	Desktop research	Investigator's own work
Survey	11th - 23rd March 2024	Online via Qualtrics	33 x online MT student participants aged 18 – 25 years old.
Analysis of survey answers	24th - 29th March 2024	Data downloaded from Qualtrics	Investigator's own work
Interview consent forms	March 2024	Google Forms	Participants 1, 2 and 3.
Interview 1 & EASE	30th March 2024 3.00pm	Zoom platform	Participant 1
Interview 2 & EASE	14th April 2024 11.30am	Zoom platform	Participant 1
Interview 3 & EASE	30th April 2024 3.15pm	Zoom platform	Participant 1
Interview 1 & EASE	27th March 2024 4.00pm	Zoom platform	Participant 2
Interview 2 & EASE	4th May 2024 12.00pm	Zoom platform	Participant 2
Interview 3 & EASE	2nd June 2024 11.00am	Zoom platform	Participant 2
Interview 1 & EASE	27th March 2024 1.00pm	Zoom platform	Participant 3
Interview 2 & EASE	4th May 2024 11.00am	Zoom platform	Participant 3
Interview 3 & EASE	28th May 2024 10am	Zoom platform	Participant 3
Transcribe interview answers	After each interview	Desktop study - transcription via zoom recordings	Investigator's own work
Analysis and coding of interview data and surveys	April – June 2024	Desktop study - via zoom recordings and transcriptions	Investigator's own work
Write up findings	July – August 2024	Desktop study	Investigator's own work
Create presentation	August – September 2024	Keynote presentation app	Investigator's own work
Submit assignment	2nd September 2024	Via Turn it In	University of Wales Trinity Saint David
Presentation	11th September 2024	Via Zoom	Voice Study Centre

The research methods chosen had to be carried out within a brief period due to the constraints of the module time allowance. It is the experience of the researcher that MT student rehearsal processes in tertiary education often start in March; therefore, it was important to collect survey data before the start of the rehearsal process when interviews were planned to take place.

Findings

Invitations and responses

The initial survey was advertised via two social media posts via the platforms Facebook (Catherine Victoria Voiceworks, 2024a) and Instagram (Catherine Victoria Voiceworks, 2024b) (see Appendices D and E) and the internet link to take part in the online survey was also sent to colleagues who teach MT in tertiary education, to share with their cohort of students. The survey consisted of twenty-three questions, including both closed questions using a Likert scale (Berg, 2001) to gather basic descriptive statistics, and questions with a request for further explanation to collect qualitative descriptive reports. The survey gathered responses from twenty-six MT students and all survey participants were aged between eighteen – twenty-five years old and were studying MT within the UK in full time education. A further social media post to attract interview participants was also used via the same outreach (see Appendix F). As a result, five MT students, who stated they had completed the survey, made contact via social media to express their interest in participating in the subsequent interview process. Two students withdrew their interest before signing the interview consent form due to time management. Consequently, three MT students took part in three semi-structured interviews at the beginning, middle, and end of the rehearsal process, which included the completion of the EASE scale which as completed via Google forms (Google, 2019) to chart perceived vocal state throughout the rehearsal and performance period. To keep the interviews anonymised, further personal information beyond the criteria to participate and year of study (to aid understanding of what level of training they were receiving), was not asked, and the students did not name which institution they were training at. Participants 1 and 2 were in their final year of study (year 3), and participant 3 was in their second year of study. All interview participants were female and although this was not part of the initial inclusion criteria, it may reflect the disparity in gender between MT students enrolled in tertiary education as the latest

University and Colleges Admissions Service's (UCAS) applicant figures show 81.8% of MT applicants were female (UCAS, 2023). This study does not have the scope to analyse this information further, but it may be that representation of different genders could be added to the criteria for the researcher's future studies. All three interview participants were studying MT full time at undergraduate level within the UK.

Coding

The six step model of thematic analysis (Braun and Clarke, 2006) was used to develop themes from the data collected in the study (Figure 5).

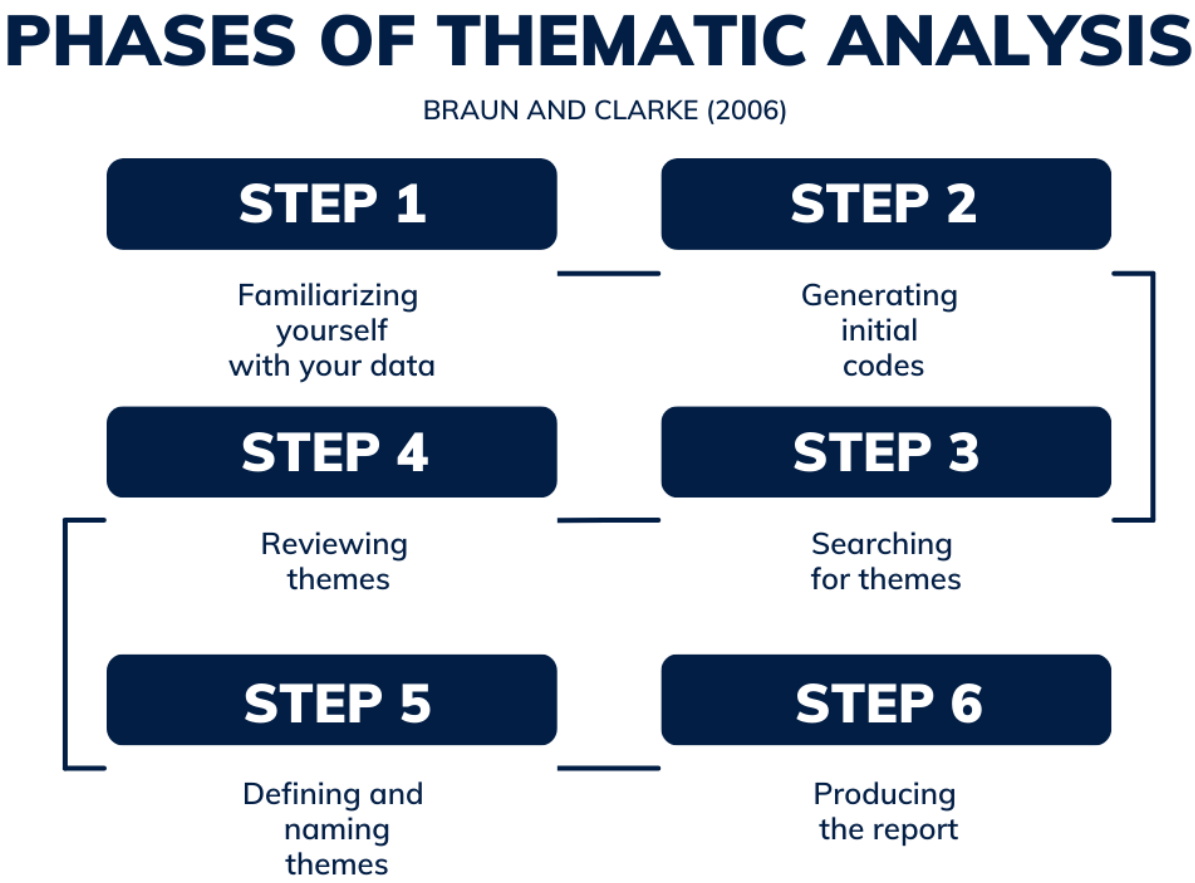

Figure. 5 Phases of thematic analysis

Due to the various methods used to collect data, several stages of analysis were implemented as follows:

Survey

Prior to beginning thematic analysis, basic quantitative analysis using percentages was conducted to establish supportive statistics in relation to the qualitative feedback from both the survey and interview data. Coinciding with Braun and Clarke's six step model, familiarity of the qualitative data was gained by first implementing word frequency analysis (Saldaña, 2016), followed by retrieving significant phrases of interest from the participants, and finally composing initial thoughts on the mix of data analysed at this stage. In Vivo coding was used to generate the initial codes (Saldaña, 2016) which were then generated and formed into categories to develop themes from the survey. Based on the data retrieved so far at this point, the interview questions were then reviewed (discussed on page 31). Figure 6 shows a clear visual representation of this analysis.

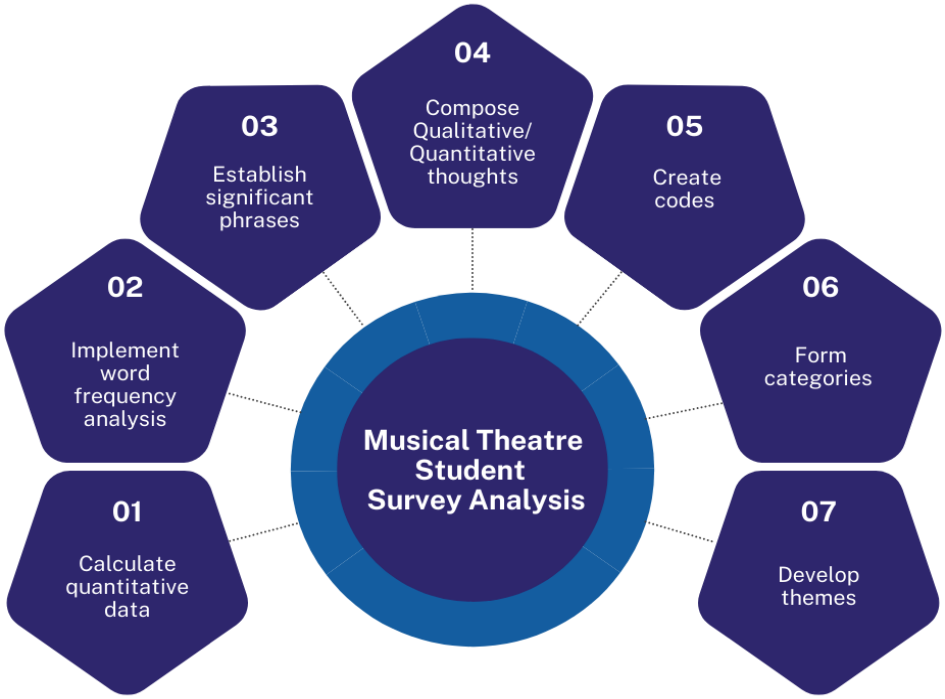

Figure 6. MT student survey analysis process

Interview

Whilst the survey was active, interview questions were composed based on the researcher's initial concerns and literature review data to be refined once the survey was closed. The data retrieved from the survey, was useful to confirm that the questions to be

asked were relevant and would encourage detailed explanation of the thoughts of participants at various stages of the rehearsal process. In total, twelve interviews were completed (three for each participant). At the end of each interview, the data was transcribed verbatim with the support of real time AI transcription (Otter.ai, 2024). After the initial interviews, the researcher used reflection on action (Schön, 1983) as they found that when watching the interview recordings back, questions were not always asked exactly as written, or double-barrelled questions were asked in an attempt to retrieve further explanation, rather than allowing the participant time to respond (Berg, 2001). Although, this did not seem to affect the participants, in the following interviews (middle and end of process), the researcher practiced reflection in action (Schön,1983) during the interviews, resulting in what was felt to be an improved interview technique. Further familiarisation was gained by watching the visual recording of the interview to analyse any additions such as liminal signs (Dingemanse, 2020) that were not obvious from reading the text alone. Like the survey analysis, words and phrases of significance were coded and all data was compared with the feedback from the EASE self-perception scale. At this stage, the initial themes developed from inductive analysis of the survey were reviewed to see if the data from the interview corresponded with the same themes, or if additional themes needed to be considered, however, all the interview data correlated with the themes already established. After the interview process was concluded, the data was observed as a linear process from the first to the last interview to view the rehearsal and show period. Overall, thematic analysis was a “recursive process” (Braun and Clarke, 2006, p.86) not only to ensure thorough comprehension of the data, but also to align evidence from the three methods of data collection. Finally, the themes were defined and named followed by the production of the report (Braun and Clarke, 2006). A clear breakdown of the interview analysis process for this study is presented in Figure 7.

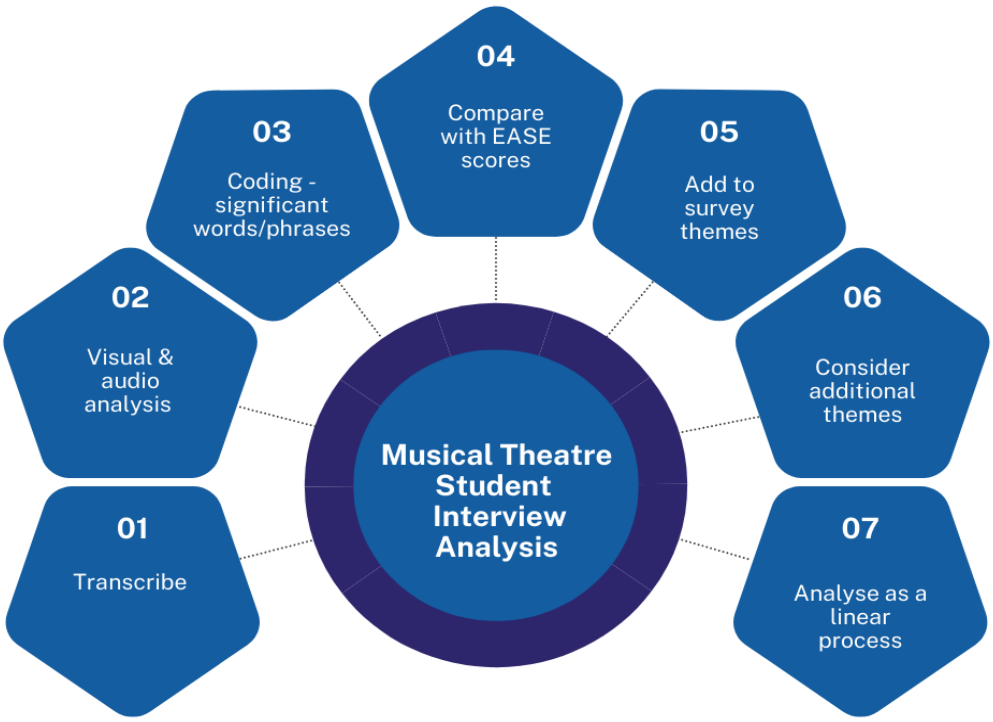

Figure 7. MT student interview analysis process

Interviews & EASE

All three participants took part in three interviews (see Appendices M, N, and O for P1, P, Q, and R for P2, and S, T, and U for P3):

- Interview 1 – Early stage of the rehearsal process
- Interview 2 – Middle stage of the rehearsal process
- Interview 3 – End stage of the rehearsal process

Before each interview, the EASE self-perception scale was completed (see Appendix W for P1, X for P2, and Y for P3). This was not referred to within the interview, rather it was analysed by the researcher after the interview in relation to the participants answers (see Appendix Z). EASE scores were calculated with nineteen positive statements added together, and the three negative reverse scored, to form a total score between the lowest score of twenty-two and highest score of eighty-eight. The scores were reviewed both as a linear time scale to see how the self-perception scores varied at each stage of the process (see Figure 8), and also as twenty-two individual statements compared to the interview

answers given to conclude if there were any discrepancies in the interview answers compared with the scores given for each item (see Appendix Z).

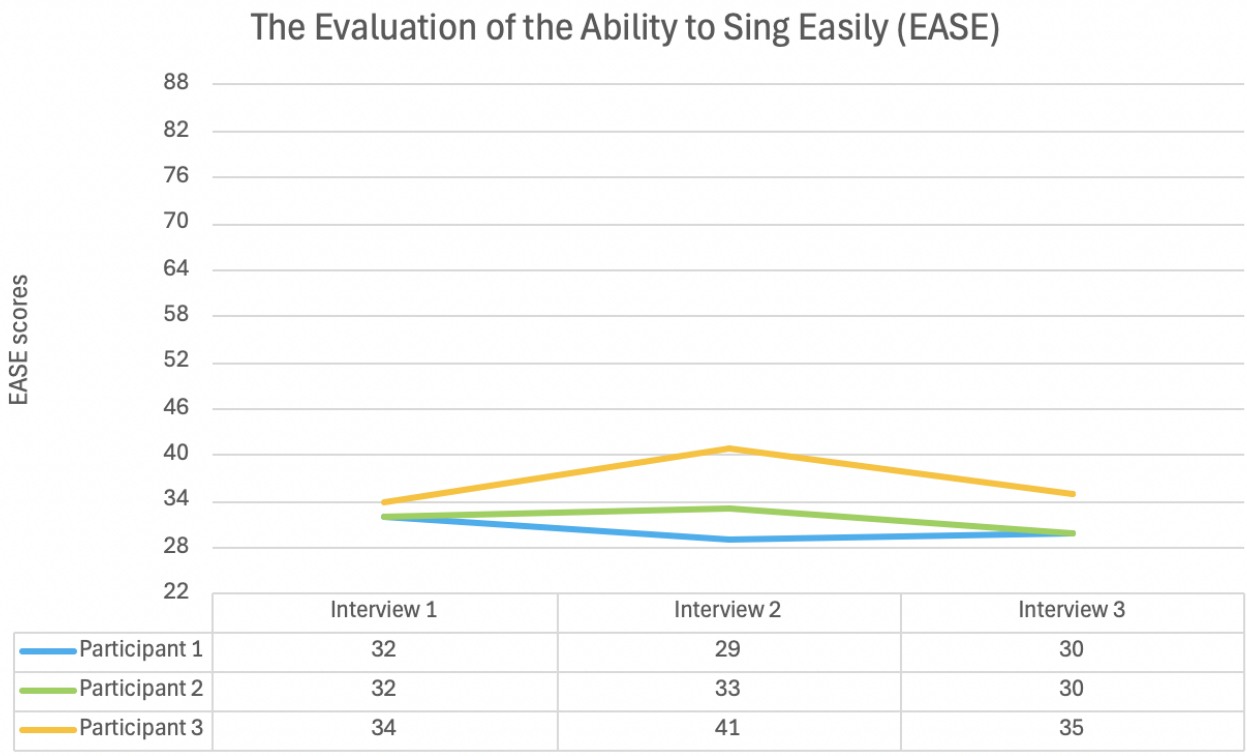

Figure 8. MT student EASE scores across interviews 1, 2 and 3

The overall linear perception of the EASE scores did not highlight any particular concern of vocal injury with scores remaining low throughout the process. EASE scores did align with participant feedback for the much of the process, and any inconsistent scores, being scores that did not represent their interview responses, are discussed throughout the results.

<u>Thematic analysis</u>

Four themes were developed from the initial survey.

- Vocal demands
- Physical demands

- Mental demands
- Vocal hygiene

The themes were developed from finding twenty-three codes which were subsequently put into eleven categories from which the four main themes were established. Some of the codes were duplicated as they were relevant in more than one category (see Figure 9).

CODES	CATEGORIES	THEMES
• Warm up/warm ups • Control • Technique • Lip trills/sirens • Breath/Breathe/Breathing • Project/Projecting, Volume, Loud/Louder • Rest	Vocal practice	**VOCAL DEMANDS**
• Breath/Breathe/Breathing • Project/Projecting, Volume, Loud/Louder	Microphone	
• Strain/Strained • Push • Tired, Fatigue/Fatigued	Negative vocal observations	
• Warm/Warmer/Warmed	Vocal observations	
• Stamina • Movement • Breath/Breathe/Breathing	Movement	**PHYSICAL DEMANDS**
• Teachers/Directors	Relationship/ Communication ability	**MENTAL DEMANDS**
• Struggle • Demanding • Difficulty • Pressure • Tired, Fatigue/Fatigued • Push • Understand/Understanding	Coping ability/Pressure	
• Vaping • Alcohol • Talk/Talking/Chatting	External factors (outside of rehearsals)	**VOCAL HEALTH**
• Water/Hydrate/Hydration/Dehydrate	Vocal hygiene	

Figure 9. Themes, categories, and codes

Results

The results will be presented as four sections to represent the four themes created and will include data from both the survey and interview participants, to be analysed side by side. Full results can be found in the following appendices:

- Survey results (see Appendix AA)
- Participant 1 interview answers (see Appendices N, O and P) and EASE scores (see Appendix W)
- Participant 2 interview answers (see Appendices Q, R and S) and EASE scores (see Appendix X)
- Participant 3 interview answers (see Appendices T, U and V) and EASE scores (see Appendix Y)

Interview participant information:

Participant number	**Rehearsal period**	**Role**	**Number of shows**
Participant 1 (P1)	Four weeks	Ensemble and leading role cover	Nine (P1 performed in nine shows over a six day period which involved both performances in single show days and double show days).
Participant 2 (P2)*	12 weeks (with a one week and two week break within the full rehearsal process)	Supporting character, off stage vocal ensemble, and vocal captain	One
Participant 3 (P3)*	12 weeks (with a one week and two week break within the full rehearsal process)	Ensemble	One

*P2 and P3 were not rehearsing for the same show.

Of the twenty-six respondents who answered the survey questions, twenty-five stated that they usually had solo and ensemble vocal demands when performing in MT students shows. Only three stated they were currently suffering with vocal problems.

Theme 1 - Vocal demands

Vocal preparation – warmups

In the survey, when asked if a warmup is part of their rehearsal preparation, 58% of students answered “always”, a similar result to an online vocal warm up student survey in 2012 by Gish *et al.* who found that many music students understood the importance of warmups to achieve a better sound, but a lesser amount connected warmups to preventing vocal injury. It could be argued that 58% seems a low response, given the numerous benefits to vocal warmups which improve vocal quality, including increased vocal efficiency and flexibility (Reckers, Donahue and LeBorgne, 2020), and although a further 31% responded “Most of the time”, the importance of vocal warmups in preventing risk of vocal injury (Gish et al., 2012) should not be overlooked. It could be suggested that rehearsal leaders should ensure warmups are carried out to avoid possible vocal injury. Following the survey, interview responses of this study provided further information as to the detail of warmups provided showing variable practices. For example, P1 and P3 did vocal warmups within the rehearsal session, whereas P2 was asked to “arrive warm”. Therefore, rehearsals leaders could be questioned that if warmups are not being conducted within rehearsals, how can they be sure they are working safely with student's voices? The survey data collected does suggest that many students are not only doing rehearsal led warmups, but 81% of students said they took part in both rehearsal warmups and performed warmups in their own time, with 19% warming up during rehearsals only. These figures could suggest that many students are aware of how to warm up their voices independently, and perhaps students can follow the instruction to “arrive warm” (P2). However, P2's experience of warmups during the rehearsal process was negative throughout all three interviews, often referring to their frustration in a non-related question. They suggest that more vocal warmup time should have been given within the rehearsal session, and when warmups were rehearsal led, they felt that they were not appropriate warmups, and it left them feeling vocally fatigued. P2 implied they were knowledgeable

about singing technique and vocal health having had several years of training before joining the MT course, and although they would personally warm up before rehearsals as instructed, P2 stated that by the time they would arrive at the university they felt they needed another warmup, and any vocal exercises performed in the rehearsal were insufficient. Therefore, rehearsal leaders could consider adaptive warmups ensuring individual vocal needs are met which could be addressed in a working document. P1 and P3 did not appear to have any issues with warmups, instead they found them helpful and both participants experienced a similar change in warmup practice midway through the rehearsal process, stating that vocal warmups took place directly after physical warmups to get used to being out of breath when singing, which they believed helped them prepare for the combination of singing and dancing, a topic which will be discussed in the physical demands section. With variable practices of warmups described in the data analysis, it could be concluded that there is a need for the scheduling and content of vocal warmup practice to be addressed in a working document for rehearsal leaders.

Vocal recovery - cool downs

In comparison to warmups, responses to cooldown practice were significant, suggesting the participation of cooldowns is not a regular practice in student rehearsal sessions. A considerable 65% of MT students, “Never” included a cooldown at the end of a rehearsal, with 27% responding “Sometimes”. This was anticipated, as in previous published studies, cooldowns are not as normal a practice as warmups (Ragan, 2016), and Gish *et al.* (2012) found that many singers who did perform vocal cooldowns had at least ten years of experience. Moreover, of the survey participants who did include a cooldown, 67% said that this was done in their own time. It could be argued that those who do perform vocal cooldowns have experienced the benefits which include tone accuracy and production (Reckers, Donahue and LeBorgne, 2020) and less vocal fatigue (Ragan, 2016). What is promising is that the survey and interview participants who do cooldowns, perform effective exercises such as lip trills, hums, sirens, and SOVT (semi-occluded vocal tract) exercises, yet it does not appear to be a consistent practice in rehearsals. P1's concluding comments in the final interview brought up this issue. Although P1 incorporated cool downs into their rehearsal recovery regime, they wished for more explanation from directors within the rehearsal process about how and why they are effective so they could further understand the importance of performing them, and goes on to suggest how she may have felt if she was educated further on cooldowns. Selected comments highlighting

this concern from P1 are as follows:

- "...here and there we have like tips and tricks on how to cool down but it was never like a set thing not like the warm up was"

- "...whenever I did try and do a cool down myself, I wouldn't have been like uncertain on what I was actually aiming to do".

Therefore, in agreement with Ragan (2016), it should be important to educate students on the importance of vocal cooldowns.

Although P2 referred to the importance of warmups several times within all interviews, cooldowns did not have the same priority, stating in interview 1, "I just usually don't do any". P3 did her own cooldowns after rehearsal as they found if they did not do any their "throat hurts". This could be attributed to the observation made by the researcher in P3's interviews that they struggled with some technical aspects of singing. Therefore, it could have been incorrect technical application that contributed towards feelings of being "tired", finding the vocals "tricky" and "demanding", leading to the P3's observation of their throat hurting. Moniz (2022) describes a singer who is unable to manage vocal load and presenting issues such as "muscle imbalances, poor flexibility, insufficient endurance, or limited stability" as "deconditioned" (p.606). The researcher suggests that if a student such as P3 who struggles with vocal technique is subject to heavy vocal loading in rehearsals, they could be described as deconditioned and would be at greater risk of vocal injury. Further discussion regarding technique and its impact on vocal health will be presented in the following section, and further rehearsal recovery aids that can contribute to vocal a cooldown process, will be discussed in the vocal health theme section.

To summarise, a working document could consider the varying vocal abilities of students to manage their vocal health, and ensure the importance and understanding of cooldowns are communicated to students and not overlooked in rehearsals.

<u>Perception of voice</u>

When asked whether students noticed a difference in the quality of their voice at the end of a rehearsal, most answers indicated some sort of voice quality change (see Figure 10).

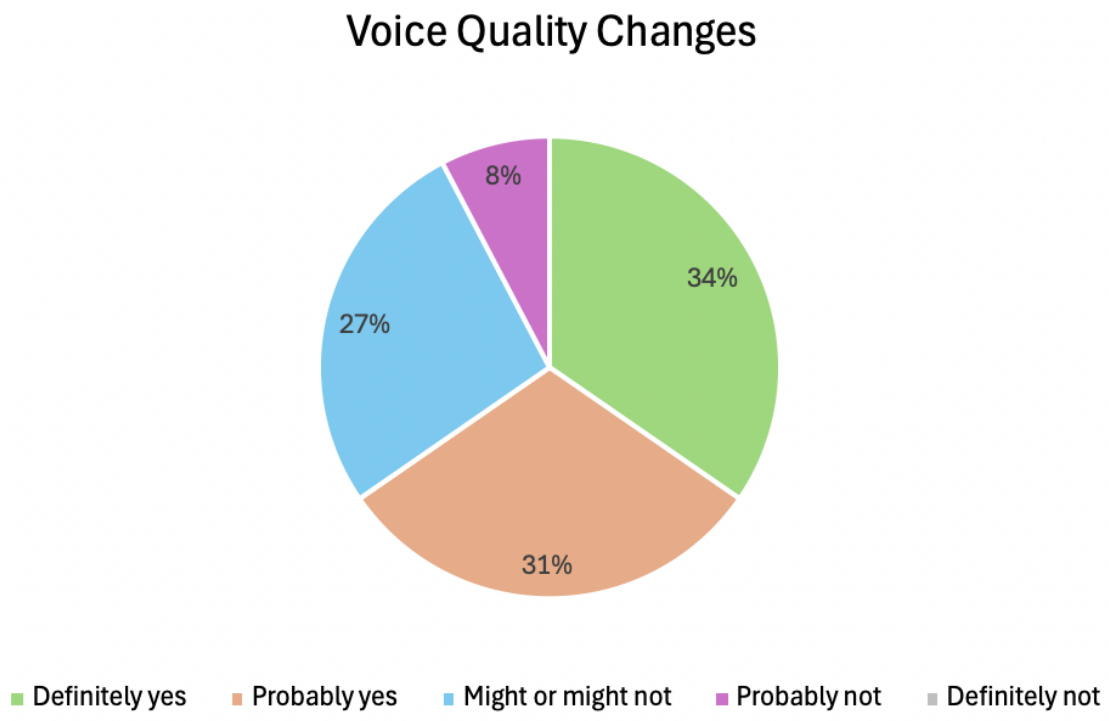

Figure 10. Survey responses to question 11: Do you notice a difference in the quality of your voice at the end of a rehearsal? Please describe the changes in your own words.

However, the results regarding voice quality changes were both positive and negative; some selected comments reflect this as follows (all answers can be found in Appendix AA):

Positive from "Definitely yes":

- "My vocal technique and placement seems a lot better".

Negative from "Definitely yes":

- "My throat is usually very achy"

Positive and negative from "Might or might not":

- "Sometimes there is less strain, sometimes there is more aching within my throat"

These varying answers indicate that students are experiencing different individual vocal quality changes after rehearsals. It could be suggested that the variety of positive and negative responses could be due to students having various levels of vocal demands based on the roles they are assigned. Furthermore, when asked how their voice was feeling during rehearsals, P1 describes her voice during the middle of the rehearsal process as feeling “different at different points in the day and also varies on different days”. She had previously described the vocal demands of the ensemble in the early stages of rehearsals as “not too demanding...it's a lot of repetitive...background sound”, but the cover role is described as “quite demanding...she's in everything...so many solos, many of the group numbers...quite a lot”. Zuim, Stewart and Titze (2021) discuss the vocal impact of different MT roles with different genres of shows demanding different vocal characteristics. Therefore, this could be the reason the answers for this question produced variable results. However, other possible contributing factors to voice quality change should not be disregarded and answers from further questions about vocal fatigue and the ability to hear their own student voices in rehearsals produced further insightful information.

Vocal Fatigue

When asked in the survey how often students feel vocally tired during rehearsals, 50% answered “Sometimes” and 31% “Half the time”, indicating that many are experiencing vocal fatigue at some point during rehearsals. This result is expected as D’haeseleer *et al.* (2020) stated that the “most frequently reported symptom in musical theater actors and students is vocal fatigue” (p.292.e2). Interestingly, the interview process signified that vocal fatigue for all three participants increased mid-rehearsal process with several references to being vocally tired. This was also reflected in the EASE scores (see Appendices W, X, and Y), with scores increasing from “Not at all” to “Mildly” in response to the scale statement “My voice feels tired” (see Figure 11). P1 suggested:

> ...mid-process is arguably one of the most difficult times because it's not the adrenaline of it being the end result. It's not got the adrenaline of it being the initiating, like, first few days, I'm at that stage where like, all exhausted, we're trying to push through.

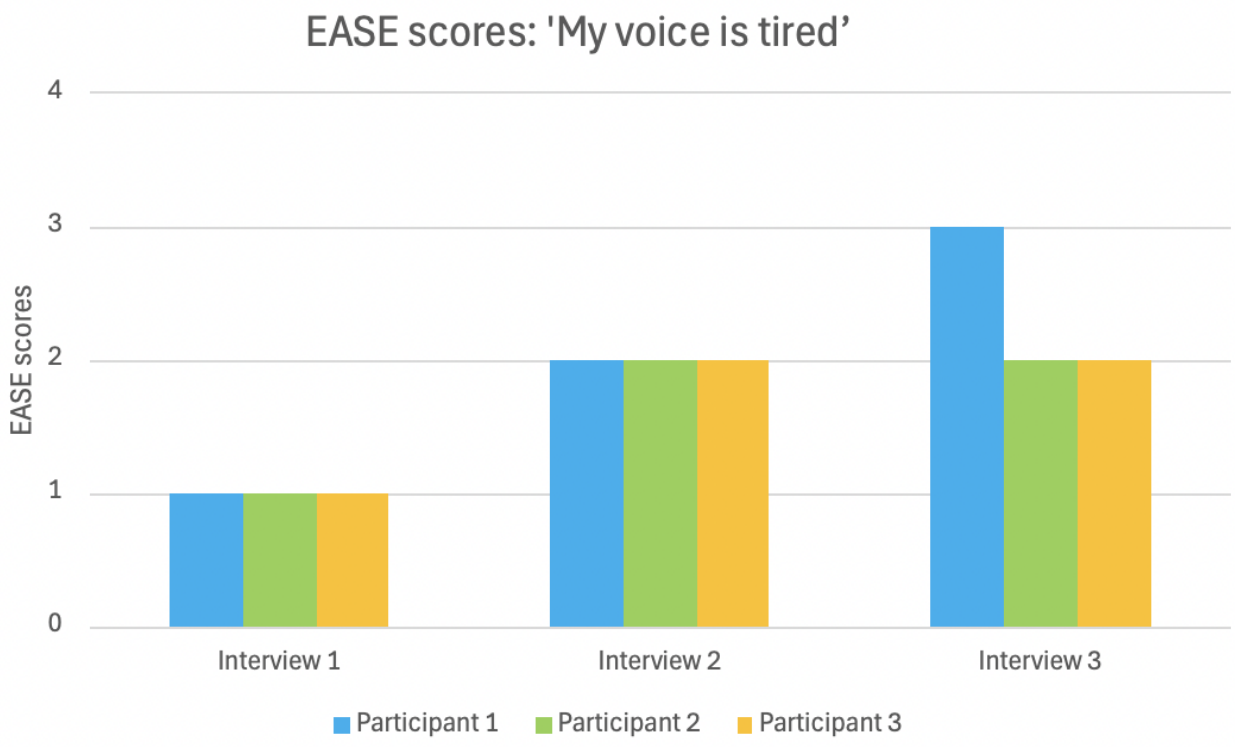

Figure 11. EASE scores: 'My voice is tired'

Paulino, Simões-Zenari and Nemr (2021) note that vocal fatigue can sometimes be viewed by the student as a “consequence of excessive effort/dedication” (p.3) and P1's EASE score increased again at the end of the rehearsal process in response to “My voice feels tired”, whereas P2 and P3 remained at “Mildly” (see Figure 11). However, P1 took part in nine shows over a six-day period which was significantly more than the other interview participants who performed one show, hence, it could be argued that P1 was simply observing her fatigue rather than suggesting it was result of the level of her commitment. Moreover, the number of shows P1 was scheduled to perform in is not unexpected as it is usual for MT performers to perform as often as this within a week's working itinerary (Phyland et al., 2014b). Yet, P1 was still a student approaching the end of her training course at the time of interview and therefore, this could have been an unprecedented ambitious task for P1. In 2021 and 2023, Zuim, Stewart and Titze offer thought provoking data in relation to changes in vocal dose throughout a rehearsal process in their dosimetry studies which clearly showed variable changes across each rehearsal which could coincide with why MT students in this present study are experiencing vocal quality

changes differently.

Length of rehearsals and vocal rest could also be partly responsible for negative vocal quality changes. Some survey respondents said they rehearsed for up to nine hours, and for all three interview participants the length and number of rehearsals increased throughout the rehearsal period. Additionally, the survey indicated that voice rest within rehearsals was rare, with 58% responding they “Rarely” received allocated voice rest, and 42% suggesting “Sometimes”. Moreover, when students do receive a break, they are still using their voices, with 58% claiming to use their voice “A moderate amount”, and 12% “A great deal”. It has been suggested that although MT students may find it difficult to make time for periods of voice rest during an intense rehearsal period, conscious monitoring of voice use both in and out of rehearsal hours and allowing recovery time would be beneficial to MT students in preventing harmful voice changes (Venkatraman, Brinton Fujiki and Preeti Sivasankar, 2021; Zuim, Stewart and Titze, 2021). Out of the interview participants, P2, who was assigned vocal captain, seemed to have limited vocal rest as any time she was not required to rehearse her scenes, she would be sent to another space to work on vocals with other cast members. These findings indicate that the monitoring of vocal rest allowance would be useful for the proposed working document as symptoms of vocal fatigue may contribute to changes in laryngeal control affecting vocal range and projection which can be improved with rest (Pacheco and Behlau, 2019).

Audibility

Another factor within the rehearsal studio that could be contributing to negative perceptions of voice quality included the initial concern of the volume of music being played during rehearsal. Survey participants were asked if they can hear their own un-amplified voice during rehearsals with 58% responding “I sometimes struggle to hear my voice”, and in contradiction 34% stating “I can always hear myself clearly”. Those who chose “Other” provided further explanations including:

- “I can hear myself at times dependant on volume of everyone with harmonies”
- “Solo and small ensemble singing yes, large ensemble, sometimes not”

Therefore, it appears that singing with both the music and the additional ensemble voices may add additional acoustic difficulties for MT students. For example, in interview 1, P2 states that if she had a microphone, she “wouldn't have to push so hard, especially numbers where you've got ensemble singing around you and you've got like a solo number to do”. Rumbach's 2013 study assessing vocal problems for group fitness instructors confirm that the “instructor’s voice must also compete to be heard over loud background music and environmental and participant noise” (p.524.e11) which is arguably a similar environment to an MT soloist performing in the rehearsal studio alongside the ensemble voices and amplified accompaniment. P3 also makes similar observations in interview 1, stating it is “quite difficult to hear myself as well...fighting over that music...to project more...and make sure I can hear myself....no one else is gonna hear me if I can't hear myself...”. Interestingly, P2 and P3 both answered “Not at all” for the EASE scale statement, “I am having difficulty projecting my voice”. This could mean that they do not associate the problem with their own ability to project, rather it is an issue with the volume of the music.

It is now widespread practice for MT singers to use “microphones and electronic amplification” in live performance (Echternach et al., 2014, p.653.e1). However, results from this study suggest the use of microphones tend not to be used until the final stages of the rehearsal process which is representative of the researcher's experience within tertiary education. Moreover, almost 54% stated that they noticed a difference in the way that they use their voice when using microphones, further descriptions from those that answered “Yes” they did notice a difference provided positive statements such as:

- “I feel less pressure to push my voice to be able to hear myself”

The survey also presented some unanticipated comments including:

- “Projecting a little more incase it doesn’t work”

It is clear from the last statement and others (see Appendix AA) that some students are not used to using microphones and need some additional training, and with many only

receiving a short amount of time to adapt to singing with microphones in the rehearsal process, it could be argued that their ability to perform is compromised. For example, P2 only used microphones on the day of the show. They said they had to “sing loud” as the microphones were not “turned up”. Furthermore, they perceived that the levels of the microphones affected the balance of harmonies, causing P2 to sing louder to project their harmony as they felt it could not be heard. She described using the microphones as “a bit awkward”. Therefore, it could be argued that microphone training and the use of microphones within the rehearsal process could make a positive contribution towards the vocal health of MT students in an analogous way to a singer of popular music styles training with a microphone to become accustomed to the final performance outcome (Cafaro and Arneson, 2020). P2 liked the idea of using microphones from the early stage of the rehearsal process not only for herself, but the concern that she can hear other cast members straining their voices because “the music's very loud”. Whereas, P3 had an opposite view at the first interview and states, “I don't feel comfortable having microphones on, as I still need to work on harmonies” and did not want her voice exposed. Nonetheless, Venkatraman, Brinton Fujiki and Preeti Sivasankar (2021) state that the repeated task of vocal loading with background noise can potentially cause “long-term laryngeal tissue damage” (p.805.e13). Therefore, the issue of allowing MT singers to sing in an environment which is not set up with the same acoustics they will experience when performing in the show, must be addressed. Arguably, it is the experience of the researcher that it is not realistic for tertiary education establishment to be able to financially support the use of microphones in all rehearsals, for example, technicians are not usually present until the scheduled technical rehearsal, and this may not take place until they are in the final rehearsal space. If this is the case, then it must be argued that the volume of music being played should become an awareness for rehearsal leaders to be aware of to protect the vocal health of their students and is a topic of consideration to include in a working document. Furthermore, anecdotal feedback from P2 and P3 who were told mid-rehearsal process that some of the cast would need to project more in ensemble numbers due to the possibility that they will not have microphones in the show as the technical set up had changed and may not allow for all to be amplified, is an unnecessary pressure that could impact vocal health. A further study retrieving feedback from rehearsal leaders could offer further insight into the problem, and increased literature research beyond the scope of this study, could look further into safe levels of amplified music whilst singers are performing acoustically.

Theme 2 - Physical demands

When students were asked how much knowledge they have about managing the combination of singing and dancing/movement (see Figure 12), they imply that there is room for improvement in the education of this combined discipline which was suggested ten years ago by Morton (2014) indicating there is still room for improvement in this area a decade later. Moreover, this task is an essential requirement in an MT performer's career (Glasheen, 2017).

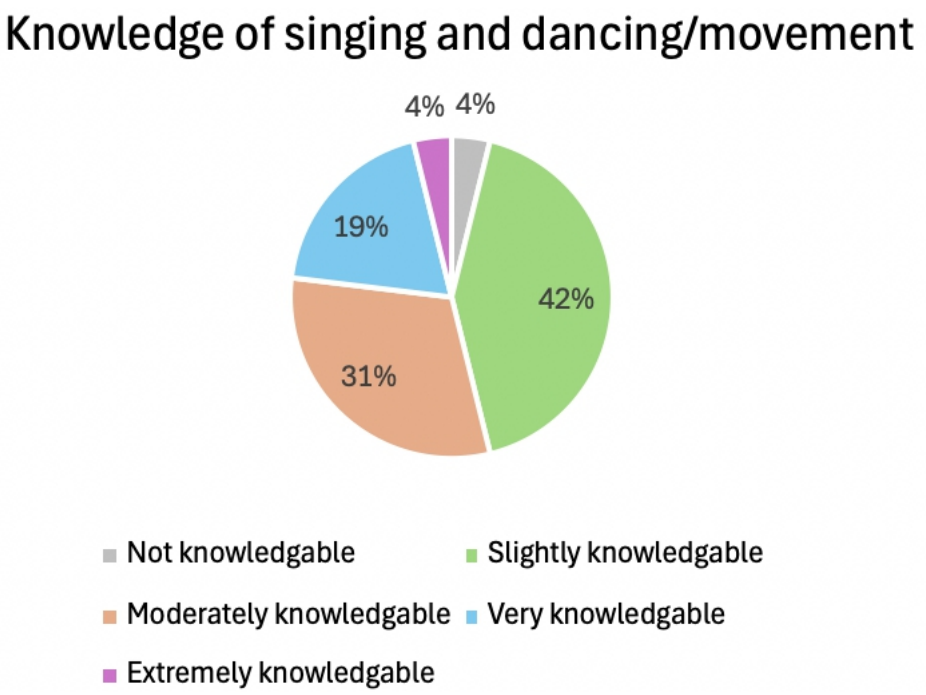

Figure 12. Survey responses to question 5: How much knowledge do you have about managing the combination of singing and dancing/movement?

Therefore, it is unsurprising based on the level of knowledge presented in the retrieved data above that a substantial 66% of students described their ability to maintain their usual vocal quality when combining singing and dancing/movement as “Somewhat difficult”. All answers required further explanation (see appendix AA for all responses) and significant phrases of interest are presented below:

Extremely difficult

- “Need further training in putting these two skills together!”

Somewhat difficult

- “Sometimes the singing isn't my main priority...”
- **“**The body is trying to work in two different ways”

It is clear that from these results that physical movement whilst singing is affecting vocal quality, and in the last statement the student appears to be aware that the multitasking of these disciplines can be difficult often to due contradicting instructions for breathing and alignment (Morton, 2014; Glasheen, 2017; Hagen, Kvammen and Lessey, 2018). Therefore, in agreement with Hagen, Kvammen and Lessey (2018) there needs to be more emphasis on “collaborative teaching” (p.4) to bridge the gap between the two disciplines. Yet some students do suggest they can manage the task with more ease. One survey participant answered, “Somewhat easy” further stating that, “I find my physical movement doesn’t affect my vocals”. However, one could argue that this is a self-perception statement, and they may not be aware of the impact that “athletic dance” (Sliiden, Beck and MacDonald, 2017, p.253.e10) can have on the voice, as research has found that when combining these two disciplines, one task is often compromised. Another statement from the “Somewhat easy” choice was **“...**I’ve been performing for a while. I have been able to gain the vocal stamina and diaphragmatic strength to sing and dance”. This could suggest that the choreographers they are working with understand the demands of the task, and therefore, the student is receiving adequate training in this area. Perhaps a larger number of respondents would have reflected literature that supported the suggestion that MT performers had stronger fitness levels than performers of other dance genres (Stephens and Wyon, 2020). Nonetheless, these results from word frequency analysis of the qualitative data obtained in the survey, highlights the repetitive use of the words “breath” and “stamina” presenting as the most frequently used words which can be seen in Figure 13. Those words in isolation could indicate observation of some of the requirements needed for singing and dancing (Glasheen, 2017), yet alongside negative words such as “difficult” and “struggle”, it could be argued that alongside the quantitative data, this task presents demands that many students may not be comfortable with. Evidence also shows that using the voice in situations of stress or high-pressure can result

in increased “autonomic arousal” (Venkatraman, Brinton Fujiki and Preeti Sivasankar, 2021, p.805.e15) which can elevate vocal effort and raise activity of the laryngeal muscles. Therefore, this feedback is important when considering practical solutions for students to manage the combined task.

Figure 13. Word frequency for question 4: When combining singing with movement/dancing, how difficult is it to maintain your usual vocal sound/quality?

It was interesting to gather further insight into this task from the interview participants. The student rehearsal process for both P1 and P3 started with separate practice of each discipline and when interviewed at the mid-rehearsal stage both participants had begun the combination of singing with movement and dance which is representative of observed student rehearsal process by the researcher and a frequent practice within the professional industry (Morton, 2014). P1 found she was was making improvements as the rehearsals continued and found jogging whilst singing a useful exercise to assist with the task. Nevertheless, she stated that keeping the vocals “authentic and characterful” was “a difficult combination” when dancing simultaneously. Venkatraman, Brinton Fujiki and Preeti Sivasankar (2021) describe the combination of singing and dancing as a dual task, however, it could be argued that adding the additional element of acting through song which P1 struggled with in this instance, adds a third task to consider when performing, hence the term “triple threat” (Morton, 2014, p.212). P3 described the combined task as “a

massive challenge" as she does not think she has done so "much dance in a musical before" and as Morton (2015) suggests, it is often "left to the performer to try to overcome the choreographic and vocal conflicts" (p.71). Adding in the element of vocal fatigue already discussed in vocal demands, this additional demand of dancing simultaneously could contribute to poor vocal health if not managed sufficiently and sustainably in the rehearsal process. Further information was gained in association with singing and dancing from P1 who spent a full week with microphones and described the avoidance of "panting". The cast had been advised about "audible panting" after dance numbers before they were using microphones, however, in her first show P1 said the adrenaline made her perform as follows:

> ...more full out...then I was more exhausted, my stamina was tested, which obviously impacted my voice and like I have noticed it was quite an important thing...after the numbers, to be in control of my breath, because otherwise, onstage wearing microphones, all you could hear was this panting.

The data suggests that most students only learn how to manage the combination of singing and dancing within the show rehearsal process. In agreement with Morton (2014) and Glasheen (2017) and their discussions about training stopping short of combining these two skills, MT training course leaders could potentially review training elements to include the management of this highly demanding skill which is not only required for students shows but is a necessity for future MT performers. There could be a focus on not only building stamina but also building awareness of the balance between gaining stability of the core for the dance elements without restriction of diaphragm movement which in turn will reduce "tension in the muscles of the neck and vocal apparatus" (Morton, 2014 p.214).

Another considered physical demands were the use of costumes, as sometimes a costume can present challenging issues (Morton, 2014). For example, the survey answers included references to difficult experiences:

- "Tight clothing has often made breathing feel difficult or has changed the posture I may have once been used to singing the song in"

- “I had to wear a plastic bonnet which made it difficult to hear the music and myself”

However, only 23% answered “Yes” when asked if the use of costume in dress rehearsal impacted their voice and interview participants did not have any significant issue with costumes apart from P2 who was given a party hat with a tight string around the neck on the day of the show which was unanticipated, but did not affect her vocal performance. On reflection, P2 and P3 wore footwear which had a heel; however, they did not believe this would affect their vocals suggesting they were not associating the change in alignment with their vocal delivery.

Theme 3 - Mental demands

An MT student's ability to cope with the rehearsal process is a topic that appeared in both the survey and interviews. Significant repetitive words related to the ability to cope that were repeated often in the survey are presented in Figure 14.

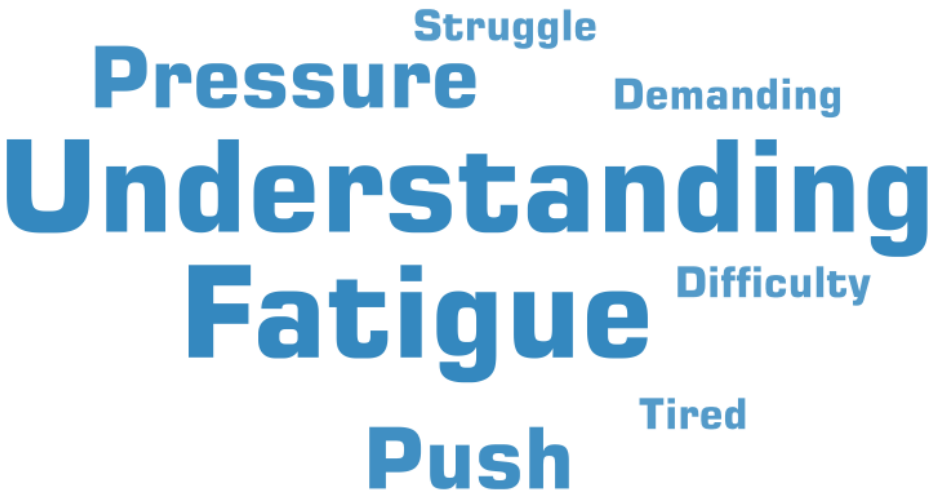

Figure 14. Ability to cope codes from survey

The topic of pressure appeared when questioning the student – director relationship which presented concerns within the survey. When asked if students ever continued to sing during rehearsals when they were aware they may have a vocal health issue, the results

were split fairly evenly, a similar result to Suddeth and Flynn's (2022) study of performing arts students with vocal injury, which included analysis of the voice teacher/student relationship retrieving contrasting results, with some stating that only their voice teacher was aware of their vocal injury and other feedback which included a student concluding that other faculty members would not understand or know how to handle a vocal diagnoses. Those who answered “Yes” in this present study gave further explanation which provided additional information to increase understanding of the result. Significant phrases of concern arguably demonstrating feelings of pressure included:

- “I don't want to let others down”
- “The pressure of being the main role”
- “...I will sometimes continue to push through as I know I can rest and sort my voice out at home...”
- “After illness, I had a show in which I was forced to push my voice at a time it already felt weaker.”
- “We often don’t get vocal rest and it isn’t taken seriously”

The above statements signify some possible misperceptions about pressure to sing when a student has a vocal concern, and communication between students and rehearsal leaders is something that has concerned the researcher after receiving anecdotal feedback from students that their rehearsal leaders do not allow them to stop singing if there is a voice concern, or they do not feel they are able to voice their concern to the director in case of a negative response that will impact their grades. Without witnessing this situation within a rehearsal, it is difficult to conclude that some rehearsal leaders are allowing this practice to occur within rehearsals. However, this concern is further supported by qualitative responses to whether they would report a voice concern.

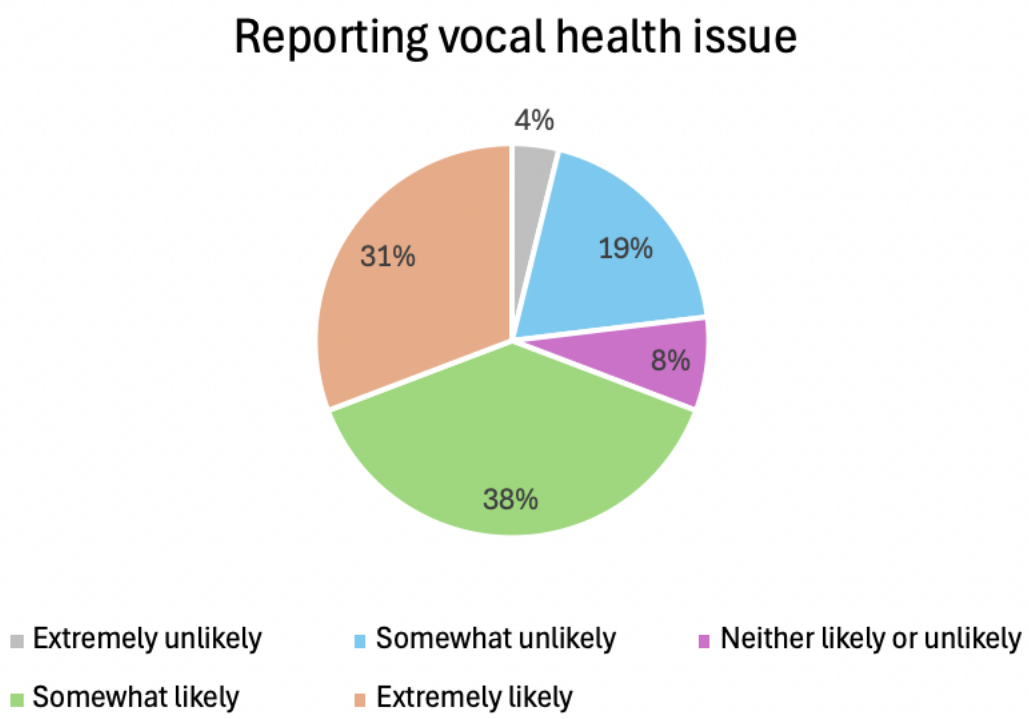

Figure 15. Survey responses to question 18: If you had a concern about your voice before, during or after a rehearsal, how likely would you be to report it to the rehearsal director?

Although the numeric data presented reassuring results (see Figure 15), further explanations from students, particularly from the "Somewhat likely" section presented concerns for the researcher, these included the following selected statements:

Somewhat likely:

- "It depends how bad it is, and how I think they are to react"
- "College tells us the attitude that you get on with it and won't be allowed in the professional world"

If students do not feel they can openly voice their concerns about vocal health, this could lead to vocal injury, and as Suddeth and Flynn (2022) note, students "may carry that same shame and stigma into the professional world" (p.2). Therefore, results from both this current study and data retrieved by Suddeth and Flynn, highlight a need for a more transparent strategy whereby students could have a protocol to follow if they feel their

voice needs rest.

Although the length of rehearsal contributing towards vocal fatigue was previously discussed in the theme of vocal demands, interview participants offered further insight into how the pressure of long rehearsals can impact their mental health too, with P3 stating mid-rehearsal process “I'm not just vocally tired but mentally as well”. In the first interview P1 was ensuring she had time away from rehearsals to have “separation” for her to work at her full potential in the rehearsal studio. As the rehearsal process continued, additional hours affected her energy levels and affected her “mentally”. She adds that the hours have “quite drastically been increased, which I kind of struggled with...quite a lot yesterday, I noticed a big difference in my energy levels...mentally I needed a day off”. P1 seemed astute in preparing for show week as she is aware she can get “impacted” and “overwhelmed” when rushing, yet she still felt vocally and physically exhausted when she got home from rehearsals. Roll and Goffi-Fynn (2021) carried out a study on voice maintenance for MT Broadway performers on tour and stated that lack of routine can contribute to an emotional health challenge for performers. Therefore, it is unsurprising that P1 experienced her struggles due to a change of routine from the usual course timetable. P2 experienced mixed emotions, explaining that the cast became “disheartened” mid-rehearsal process, and she tried to regulate her own individual state of mind stating, “I just make sure that I'm in a happy place and everything will be fine”. Yet, in the weeks leading up to the show, P2 felt the musical/vocal direction was lacking and they personally led an additional rehearsal, using an outside studio paid for by the students, as the university had no area available to work in. Moreover, P2 felt frustration with only having one director, who focused mainly on ensemble work and choreographed the show within the rehearsal time. They believed the choreography could have been done prior to the rehearsal to allow more time to focus on acting scenes and vocals, as on the show day P2 said “I could have definitely been more prepared”. These circumstances could have added to a sense of additional pressure as MT students have been reported to have a “high prevalence of stress and anxiety” (D’haeseleer et al., 2020, p.292). The result of additional stress could put students at a higher risk of upper respiratory infections (Cohen, 2005, p.126) as there is an association between stress symptoms and vocal symptoms (Holmqvist et al., 2013, p.787.e8) which in turn could lead to problems with vocal performance or not being well enough to perform at all. In addition, Pacheco and Behlau (2019) state that MT singers face challenges which make them vulnerable to vocal issues

causing “altered laryngeal function” (p.804.e17) which in turn has an impact on their mental well-being and their career.

Theme 4 - Vocal Health

Although many respondents suggest they are aware of vocal health considerations (Figure 16), it is difficult to know if the survey results are accurate, as classroom experience has shown the researcher that many students can retrieve inaccurate information from unreliable sources. Therefore, this result felt inconclusive and it was important to review answers regarding vocal hygiene practice and vocal health education to provide more information.

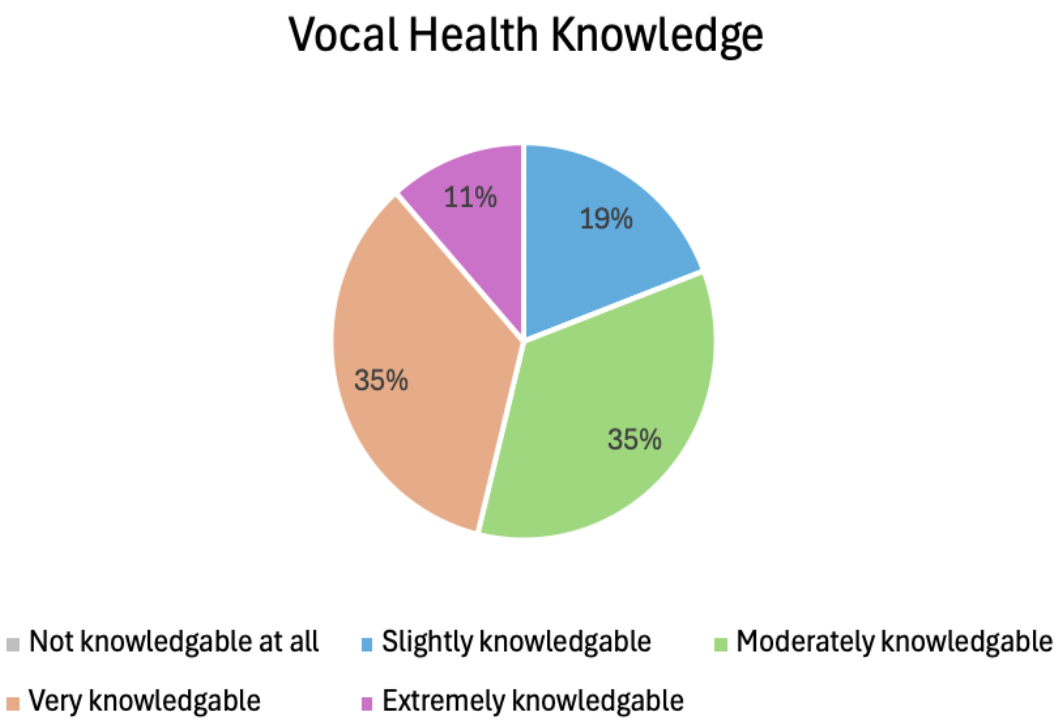

Figure 16. Survey responses to question 22: How would you rate your knowledge on vocal health for singers?

When asked to think about whether anything in their lifestyle outside of show rehearsals may contribute to poor vocal health, the results were even. Significant words from the 50% who answered “Yes” are featured in Figure 17.

Figure 17. Word frequency for question 20: Thinking about your lifestyle outside of show rehearsals, is there anything that you think may contribute to poor vocal health?

These off-stage behaviours included talking loud or extensively in both social situations and in their workplace. Others note the unhelpful effects of vaping, smoking, caffeine, and alcohol, although it is not clear if students understand how this affects the voice. All data supports previous studies that have acknowledged these activities and habits as contributing to poor vocal hygiene (D'haeseleer et al., 2020; Suddeth and Flynn, 2022).

Although some students mention they do not hydrate enough, the survey question regarding how likely they are to stay hydrated during rehearsals produced positive results with 38% responding "Somewhat likely", and a further 38% answering "Extremely likely". Interview participants were all aware of vocal hygiene practice yet also confirmed they did not always follow best practice, for example P3 was aware that she "forgets to drink...even during rehearsal". Interview participants were also aware of additional tools to aid recovery after a rehearsal with P1 using a nebuliser and all three participants completing a vocal steam when their voice feels tired. However, P1 was surprised that during the rehearsal process, vocal health information felt like something that students had to work out for themselves. She states in the first interview that vocal health discussion "isn't very much

driven by the creatives we have to sort of be very knowledgeable about that, like for ourself, away from the space". Although this improved part way through the process, including advice about "after hours of care", at the end of the process she still did not understand the benefit of cooldowns.

As the interview participants were able to offer additional information beyond the scope of the survey which included the full rehearsal process from the beginning until after the performance of the final show, additional on-stage factors were discussed by P1 in the final interview as she described the air on stage as dry and very hot. On double show days she felt the need to hydrate more and used her nebuliser to recover. On-stage smoke was also used, and although P1 thought this did not affect her vocals, Phyland *et al.* (2014b) suggests this can be a challenging factor for vocal health, and D'haeseleer *et al.* (2020) notes this can have a negative impact on vocal quality. All three of the interview participants noticed a change in voice quality on show day, therefore, on reflection this should be something rehearsal leaders can prepare students for in advance.

Many of those who wanted to add any thoughts at the end of the survey suggested that directors need to be more informed about vocal health (see Appendix AA). Although the statements are anecdotal, and it could be argued in response that rehearsal leaders do know about vocal health, perhaps it is simply that the knowledge is not being transferred to students. However, this cannot be assumed, and these concerns must be received as the participants profess the situation to be. Therefore, within a document for best practice it could be useful to add vocal health information for both inside and outside of the rehearsal studio to be passed on to the students, as well as having advisory measures for rehearsal leaders to be aware of in their own rehearsal delivery.

Document for best practice

Based on the results of this study, the researcher concludes that there is a need for a working document to be developed to support best vocal practice in the rehearsal process for MT students in tertiary training and it is possible, based on the supportive literature and findings of this study, to consider initial ideas and strategies. Although high vocal loading challenges are to be expected in MT training (D'haeseleer et al., 2020), the risk of injury

arguably appears when vocal issues arise for a student, the issue is not reported, and the student attempts to “push through” (P1). As a result of the findings, initial considerations for a working document are show in Figure 18.

Initial considerations for a working document to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training

- Vocal health education prior to the start of rehearsals (to include internal and external rehearsal factors)
- Effective warm up and cool down practices led in rehearsals
- Safe levels of amplified music for non-amplified singers at all times
- Instructions to students regarding suitable levels of vocal projection
- Considerations of choreography for the vocal demands
- Training strategies in place to cope with the combination of disciplines outside of rehearsals
- Vocal rest allowance
- A protocol to follow if student's have a voice concern
- Advance preparation for differences to be encountered on show days

Figure. 18 Initial considerations for a working document to work towards best vocal practice in the rehearsal process for musical theatre students in tertiary training.

Conclusion

This report has been an ardent project which has advanced the author's research skills and impacted on professional career goals within the workplace. It is hoped that the skills and knowledge acquired can be used to make a helpful contribution to the protection of MT voices in tertiary education and beyond. The project has allowed the researcher to gain a broader understanding of the rehearsal process for students in MT training within tertiary education. The completion of the report has helped expand understanding of MT vocal loading and vocal health and gather an extensive understanding of student

experience to identify potential vocal health and safety recommendations for those leading the rehearsal process. The next step in composing a working document to propose best vocal practice in the rehearsal process for MT students in tertiary education is to send a drafted document in progress to rehearsal leaders requesting their feedback. Using a similar approach to the Delphi method (Loo, 2002) (see Appendix C) the document could be updated to allow responses to changing demands, with a view to finalising the document by the input of experts prior to the document becomes accessible in the wider field of MT education. This may either be a result of embarking on a PHD route or collaborating with fellow researchers with a similar interest in MT vocal health.

Limitations and future recommendations

On reflection, the process of producing this report has been satisfactory. Some results were variable as discussed, but perhaps that is to be expected with participants not being required to be from the same institution for this project, and the multitude of MT courses on offer often deliver their training in a distinct manner (Morton, 2014). A larger scale study would have been beneficial to retrieve more interview participant data to gain a wider perspective of the rehearsal process to ensure further validity. However, the scope of this study allowed the researcher to collect data that did provide further detail about the rehearsal experience, aligned with much of the literature, and furthered understanding. Although the EASE self-perception scale was useful in terms of individual statement scores, it did not produce results of large significance, however, it could be argued that this is expected as the low scores produced reflected that the interview participants did not share any vocal diagnoses. Perhaps the best use of this tool for those who do not have a vocal injury, is to monitor self-perception and heighten awareness of vocal health in a comparable way to using dosimetry devices for those without this clinical tool. Future projects could aim to repeat a similar interview process carried out by a team of researchers who are able to analyse a larger number of findings, furthermore, it would also be useful to continue the research that has been carried out using dosimetry devices as Zuim *et al.* (2021) states, it is a good tool for singers to “develop greater awareness about their daily vocal load during singing and monitor changes over time” (p.10).

Further recommendations for future research would include retrieving data directly from

rehearsal leaders to gain their comprehension of vocal health needs and their experiences of the rehearsal process to find if there is a disconnect between the student and director experience. Although this project did not attempt to receive feedback from rehearsal leaders, the creation of a working document to work towards best practice hopes to encourage those involved in the rehearsal process to be accountable for their role in vocal health practice. This is not to imply that rehearsal leaders to do not adhere to this at present, as it may be that many leaders are already working with vocal health in mind. However, it is already a struggle for singing specialists to keep up with frequently emerging trends in the MT industry (Freeman, Green and Sargent, 2015; Hagen, Kvammen and Lessey, 2018), and therefore, it cannot be expected that rehearsal leaders are always fully informed on vocal advancements in MT, especially if it is not their main teaching discipline. Rather, it could be suggested that it is the responsibility of singing teachers within institutions to ensure collaborative practice, to improve the rehearsal process for students, and to use a working document as a guideline for faculty members to support their concerns. Equally, rehearsal leaders and MT faculties should be open to listening to the vocal health concerns of singing teachers and MT students. If MT students seek to have a long-standing career in an industry that requires high levels of vocal demand (D'haeseleer et al., 2017), their educational mentors have to ensure that they have adequate vocal health knowledge to avoid vocal injury and eliminate the risk of being out of work due to limited awareness of how to manage their vocal demands (Rangarathnam, Paramby and McCullough, 2018). By bridging the gap between disciplines via teacher collaboration, supported by a working document for best practice for vocal health, students may begin to have a more cohesive experience in training.

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