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| **Supplementary Table 1: Action inquiry methods** |
|  Stage | Purpose | Timing | Method | Approach |
| All | Documented events, reflections, and conceptual considerations [98] | Across action inquiry | Fieldnotes | The subject matter expert (SME) generated two types of fieldnotes:* Participatory-observational fieldnotes [87, 97, 98]. These notes weremade while the SME was based in the field. This included notetaking while observing coaching participation, and while engaging in meaning and decision making with others (e.g., coaches, players); and
* Reflective fieldnotes [98]. These were a method of consolidation at the end of each session. These notes made by the SME also supported reflexivity and developing conceptual knowing [31, 85, 98].
 |
| Preliminary | Deeply understand coaches’ vocally reliant coaching participation. | Pre-season to early season rounds. Across teams, the preliminary stage spanned 2–6 weeks. | 1:1, semi-structured interviews | Each coach engaged in a semi-structure, face-to-face interview with the SME [133]. Participants explored coaches’ experiences of voice and coaching, including vocal health, vocal demands, and broader ergonomic factors. |
| Coaching observations | The SME observed typical team-based coaching participation (e.g., training, games, team video analysis). This facilitated direct witnessing of coaches’ system participation within local contexts [98]. Observations aimed to detail both novel attributes of coaching contexts [31, 97, 98], and factors established within vocal ergonomics and vocal OHS [3, 13, 20, 22, 134]. |
| Sound level readings | The SME took sound level readings in coaching locations with a handheld digital sound level meter (CASELLA model CEL-633b1 – Bedford, United Kingdom). The device was set to sample readings at 5 second intervals on an A weighting in decibels – dB(A). Based on these measures, mean and peak readings for each session were calculated. Guidance from extant literature supported interpretation of readings within the context of voice use [21, 53, 135, 136]. |
| Development | Cooperative development of vocal ergonomic approaches. | One session, occurring during the pre-season to early season rounds (during weeks 3-7 of action inquiries). | Search conference | All participants undertook a collaborative workshop, known as a *search conference* [137, 138]. This inquiry orientated, cooperative workshop [137] focuses on systems (re)design [138] through stakeholders exploring and generating potential future actions [137, 138]. Participants explore experiences, common needs, and shared goals [137, 138]. Coaches and the SME worked cooperatively to develop tailored vocal ergonomic approaches (aka strategies). This search conference included four parts (detailed below).  |

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| *Supplementary Table 1 continued* |
|  Stage | Purpose | Timing | Method | Approach |
| *(Development continued)* |  |  | a. Coach feedback | The SME provided coaches with feedback on preliminary stage analysis, including individualized written feedback and discussion of feedback common to all coaches. Findings were grouped based emerging system characteristics, including recognition of facilitators and barriers to vocally reliant coaching participation [34]. Feedback highlighted context-based considerations and stimulated further discussion regarding voice use, vocal health, and vocal ergonomic factors. |
| b. Vocal ergonomics briefing | The SME briefed coaches on pertinent voice related information through an interactive presentation and discussion, including information on: * Voice production and safe voice use patterns to avoid phonotrauma [139, 140];
* Occupational vocal health [3, 13, 20, 22, 25, 58, 134, 141];
* Vocal ergonomic factors [3, 13, 20, 58, 65, 70, 134]; and
* Adapting factors to support aims of ergonomics, safety, and health (e.g., hierarchy of control [21, 142, 143].

The vocal ergonomics briefing aimed to enhance coaches’ general knowledge regarding occupational voice and support their later engagement in strategy development. |
| c. Semi-structured discussion for strategy development | Participants brainstormed potential strategies for supporting coaches’ voices. This was based on coaches’ experiences and preferences, preliminary stage findings, the SME’s practice led recommendations, and recommendations in vocal ergonomics research literature [3, 13, 20, 58, 65, 70, 134]. Participants then selected strategies to implement and discussed logistics. |
| d. VCQ | The VCQ [15, 95] is a self-report vocal health questionnaire. It probes frequency of experiencing 16 common voice symptoms, and the presence and severity of self-perceived voice problems. This questionnaire does not necessitate diagnosed or assumed (medical) voice pathology, which distinguishes it from other commonly used vocal health questionnaires. Each coach completed two paper-based copies of the VCQ: one reflecting their entire coaching career, the other reflecting the season so far (i.e., before strategies). |

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| *Supplementary Table 1 continued* |
|  Stage | Purpose | Timing | Method | Approach |
| Implementation | Trial implementation of strategies | Across active coaching weeks. Across teams, the implementation stage spanned 10 – 38 weeks. | Strategy implementation | Coaches and the SME implemented strategies. Iterative awareness insights were garnered through strategy engagement, which facilitated modification of some strategies. New strategy development also occurred in some teams, often in response to further identification of vocal ergonomic factors and coach needs. Iterative appreciation of vocal ergonomic factors occurred via coaches’ reflections, discussions between participants, coaching observations, and sound level readings. |
| Weekly voice ratings | Ongoing consideration of coaches’ voice experiences was undertaken via weekly correspondence between coaches and the SME. A 1-6 Likert type scale that was familiar to coaches was adapted, so that coaches could rate their voice for the previous basketball round (1 = voice has felt unhealthy or under-performed all the time when coaching, 6 = voice has been healthy and effective all the time when coaching). Scores below 4 were probed by the SME for further information. The SME also engaged in coach-initiated dialogue, irrespective of ratings (e.g., answering questions). |
| Observations | The SME undertook coaching observations during strategy implementation based on coaches’ needs and shared recognition of opportunities. |
| Sound level readings | Additional sound level readings were undertaken by the SME based on coaches’ needs and shared recognition of opportunities. |
| Evaluation | Evaluate strategies and action inquiries overall. | End of the action inquiry (1 session), typically at season end. | Semi-structured focus group | A facilitated group discussion (i.e., semi-structured focus group) [133] occurred between coaches and the SME. Participants met to discuss and evaluate voice strategies and the action inquiry overall. This evaluative process is essential to garner participant insights to vocal ergonomic approaches [21]. |
| VCQ | Coaches again completed the VCQ [15, 95]. They reflected on the active coaching span when their team undertook the action inquiry (i.e., after strategies). |
| *Note.* SME = Subject Matter Expert. The vocal ergonomist undertook this role as they facilitated the cooperative action inquiry with coaches. VCQ = Voice Capabilities Questionnaire [15, 95]. |

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| **Supplementary Table 2: Strategies and associated vocal ergonomic factors** |
|  |  | Vocal ergonomic factors associated with strategies a c |  | Appraisal d |  | Key context influences with strategies a e |
| Strategies a | AI b | Categories | Topics | Specific factors |  | S | SS | U |  | Facilitators | Ongoing barriers |
| 1. Systematic hydration | 5 | Personal | Vocal health | Vocal health considerations; voice symptoms; voice problems  |  | 4 | 1 | 0 |  | Enhanced vocal wellbeing for some coaches. | Diminished vocal health (one coach). |
|  |  | Activity | Vocal task demands | Task modification  |  |  |  |  |  | Additional hydration opportunities (e.g., athlete drink breaks). | Coaches sometimes forgot to bring bottle if not supplied by club. |
|  |  | Physical | Thermal climate and air quality | Artificial temperature controls; hydration habits and environment |  |  |  |  |  |  | Thermal climate continued to influence voice. |
| 2. Additional vocal health insight discussions and SME advice  | 1 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 0 | 1 | 0 |  | Enhanced awareness of vocal health; supported localized help-seeking. | Coaches did not prioritize undertaking medical-based help-seeking for voice. |
|  | Activity | Voice as coaching tool  | Voice for desired coaching outcomes; voice use patterns |  |  |  |  |  |  |  |
|  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks; vocal task adaptation |  |  |  |  |  | HCs reduced vocal workload when unwell by AC increasing task undertakings. | Demanding voice use for coaching activities was still necessary even when coaches were vocally unwell. |
|  | Team | Players | Players’ needs  |  |  |  |  |  |  | Coaches prioritized players’ performance and needs over strategy use. |
|  | Sport | Season and fixtures | Away game participation |  |  |  |  |  |  | Restricted time and equipment access during away games. |
| 3. Vocal rest | 4 | Personal | Vocal health | Vocal health considerations; voice symptoms; voice problems |  | 1 | 3 | 0 |  | Supportive personal coping behavior. | Beyond coaching responsibilities. |
|  |  | Activity | Voice as coaching tool | Voice use patterns |  |  |  |  |  |  | Used for coaching outcomes during activities, not to support coaches’ voices. |
| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(3. continued)* |  | *(Activity continued)* | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks; vocal task modification |  |  |  |  |  | Coaches often able to plan and implement vocal rest easily within training and broader work. | Games required coaches ongoing voice use. Hard for coaches to plan vocal rest, particularly due to team performance needs and broader activity demands. |
|  |  | Team | Players | Players’ needs  |  |  |  |  |  |  | Prioritized players’ performance and needs over vocal rest. |
|  |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes |  |  |  |  |  |  | Games required coaches to use voice responsively to ongoing game outcomes. |
| 4. Vocal warmup exercises | 4 | Personal | Vocal health | Vocal health considerations; voice symptoms; voice problems |  | 0 | 3 | 1 |  | Some coaches experienced increased vocal coping. |  |
|  |  | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  |  |  |  |  |  |  |
|  |  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  | Silent warmups undertaken in tandem with players’ warmups. | Vocally reliant warmups too conspicuous around others; broader ongoing tasks. |
|  |  | Club | Club-facilitated resource access | Resource access for team activities |  |  |  |  |  | Coaches with offices used them to warmup | Desired perceptions of others prevented coaches undertaking warmups. |
| 5. Planning meetings | 1 | Personal | Health and wellbeing | Coaching-life interface |  | 0 | 1 | 0 |  | Boundary around task planning. |  |
|  |  | Activity | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  | Reduced workload by reducing uncertainty. | Increased overall vocal demands.  |
|  |  | Physical | Thermal climate | Cold and wet weather |  |  |  |  |  |  | Cold location. |
|  |  | Team | Team culture | Team priorities, culture, and climate |  |  |  |  |  |  | Turbulent team climates. |
|  |  |  | Health and wellbeing | Coaching, wellbeing, and general health |  |  |  |  |  |  |  |
| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| 6. Task modification when coach ill-health affected voice | 2 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 1 | 0 | 1 |  | Coaches somewhat able to use voice when experiencing poor vocal health. | Ongoing poor vocal health (one coach). |
|  |  | Activity | Voice as coaching tool | Voice use patterns |  |  |  |  |  |  | Ongoing use of potentially unsafe voice use patterns. |
|  |  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  | Some modifications to vocal workload when unwell. | HC specific workload still required demanding voice use. |
|  |  | Team | Coaching roles | HC roles; AC roles; role definition |  |  |  |  |  | Modified role related workload; increased role flexibility. | HC specific workload still required demanding voice use. |
|  |  |  | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Some player-initiated task modification when recognizing coach ill-health. | Variable players performance. Players’ expectations regarding coaches’ voices. |
|  |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes |  |  |  |  |  |  | Task modification not always possible due to ongoing game performance. |
|  |  |  | Seasons and fixtures | Adjusting to seasonal coaching; away game participation |  |  |  |  |  |  |  |
| 7. Pausing play before key information delivery | 1 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 0 | 1 | 0 |  | Somewhat reduced need for loud voice. | Undesired for some coaching outcomes; need for loud voice. |
|  |  | Vocal task demands | Coaching at training |  |  |  |  |  |  | Players often dispersed across court. |
|  |  | Physical | Acoustic environments | Acoustic environments at training |  |  |  |  |  | Reduced activity noise. |  |

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| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| 8. Signals and gestures | 1 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 0 | 1 | 0 |  | Additional communication channel. | Frequently still needed to yell due to noise. |
|  |  |  | Vocal task demands | Coaching at training; coaching at games; vocal task adaptations |  |  |  |  |  |  | Not supplementary for all vocally delivered coaching instructions. |
|  |  | Physical | Acoustic environments | Acoustic environments at training; acoustic environments at games |  |  |  |  |  | Coaches showed players some instructions when team in heavy noise. | Noisy play-based settings. |
| 9. Postural needs assessment | 1 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 0 | 1 | 0 |  | New insights regarding voice and posture. |  |
|  |  | Activity | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  |  | Team's video analysis recordings typically focused on players. |
| 10. Apparel choices and posture  | 1 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 1 | 0 | 0 |  | Coaches increased their use of supportive head and neck postures. Coaches experienced increased awareness of postures during voice use. |  |
|  | Activity | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  |  |  |
|  |  | Club | Resource access | Resource access for team activities (supportive) |  |  |  |  |  |  |  |
| 11. Avoiding voice use in basketball stance f | 2 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 0 | 2 | 0 |  | Somewhat enhanced ease of voice use while coaching. | Coaches not always awareness of posture during coaching. |
|  | Activity | Vocal task demands | Coaching at training; coaching at games; task modification |  |  |  |  |  |  | Task modification relied on coaches altering their own behavior. Not always possible to address contributory factors. |
| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(11. continued)* |  | Team | Players | Players’ needs |  |  |  |  |  |  | Coaches often focused on athletes during coaching rather than their own postures. |
| 12. Avoiding voice use while squatting, drawing | 1 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 0 | 1 | 0 |  |  |  |
|  | Activity | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  | Coaches included pre-prepared drawing as part of their planning for training tasks.  | Coaches often focused on athletes during coaching rather than their own postures. |
| 13. Seating in timeouts | 2 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 1 | 1 | 0 |  | Coaches increased their use of supportive head and neck postures. |  |
|  | Activity | Vocal task demands | Coaching at games |  |  |  |  |  | Access to seating generally at games. | Some game venues had connected chairs at team bench, which could not be easily used for timeouts. |
|  | Team | Coaching role | AC |  |  |  |  |  |  | AC often required squatting to engage in close 1:1 talk with seated athletes. |
| 14. Reduced proximity between communication partners | 6 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 2 | 4 | 0 |  | Increased speech intelligibility, reduced need for loud voice use. | Undesirable to reduce proximity to players for some coaching outcomes. |
|  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  |  |  |
|  | Physical | Acoustic environments | Acoustic environments at training; acoustic environments at games |  |  |  |  |  |  | Noisy play-based settings. |
|  | Team | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Somewhat apparent increase in player responsiveness to coaches’ voice use. | Turbulent team climates. |
| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(14. continued)* |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes; game-related restrictions on coaches |  |  |  |  |  |  | Coaches game-day location restrictions limited use of reduced proximity. |
| 15. Modified huddle formations | 2 | Activity | Voice as coaching tool | Voice use patterns |  | 1 | 1 | 0 |  | Increased speech intelligibility, reduced need for loud voice use. | Ongoing potentially unsafe voice use for coaching participation. |
|  |  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  |  |  |
|  |  | Physical | Acoustic environments | Acoustic environments at training; acoustic environments at games |  |  |  |  |  |  | Noisy play-based settings. |
|  |  | Team | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Apparent increased player responsiveness. |  |
|  |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes |  |  |  |  |  |  | Ongoing game-day team performance. |
| 16. Voice amplification | 2 | Personal | Vocal health | Vocal health considerations; voice signs; voice symptoms; voice problems |  | 0 | 1 | 1 |  |  |  |
| Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  |  |  |  |  | Increased speech intelligibility, reduced need for loud voice use. | Amplified voices at training not reflective of games. |
| Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  |  | General public could hear amplified voices. |
| Physical | Acoustic environments | Acoustic environments at training; acoustic environments at games |  |  |  |  |  |  | Multiple amplified voices generated additional activity noise and periodic sound distortion. |
| Team | Players | Players’ engagement and coaches’ voices |  |  |  |  |  | Increased player responsiveness, easily hear instructions. |  |

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| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| 17. Moving away from sound sources at games | 1 | Activity | Voice as coaching tool | Voice use patterns |  | 0 | 1 | 0 |  | Increased speech intelligibility, reduced need for loud voice use. |  |
|  |  | Vocal task demands | Coaching at games |  |  |  |  |  |  |  |
|  | Physical | Acoustic environments | Acoustic environments at games |  |  |  |  |  | Reduced direct exposure to noise source during games. | Noisy play-based settings. |
|  | Sport | Gameday | Game-related restrictions on coaches |  |  |  |  |  |  | Coaches game-day location restrictions limited their abilities to move away from loud noise during competition play. |
| 18. Changing training location engagement | 2 | Activity | Voice as coaching tool | Voice use patterns |  | 2 | 0 | 0 |  | Increased speech intelligibility, reduced need for loud voice use. |  |
|  |  |  | Vocal task demands | Coaching at training |  |  |  |  |  |  |  |
|  |  | Physical | Acoustic environments | Acoustic environments at training |  |  |  |  |  | Reduced noise during coaching. |  |
|  |  | Club | Resource access | Resource access for team activities (supportive) |  |  |  |  |  | Ability to change training based on club resource access. |  |
|  |  | Sport | Season and fixtures | Adjusting to seasonal coaching |  |  |  |  |  |  | Coaches still experienced seasonal adjustment to vocal workload. |
| 19. Coach peer-mentoring | 1 | Personal | Health and wellbeing | Coaching-life interface |  | 1 | 0 | 0 |  | Somewhat compartmentalized planning and rumination. |  |
| Team | Team culture | Team priorities, culture, and climate; coaches’ voices shape team culture |  |  |  |  |  |  | Turbulence within team climates (players, club, team performance). |

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| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(19. continued)* |  |  | Coaching roles | HC role; AC role |  |  |  |  |  | AC increased voice use to support HC. |  |
|  |  |  | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Increased problem-solving for ongoing team challenges. |  |
| 20. Clarifying role responsibilities and vocal task delegation | 3 | Personal | Vocal health | Vocal health considerations |  | 1 | 2 | 0 |  | Increased awareness of voice during coaching. |  |
|  | Activity | Voice as a coaching tool | Voice for desired coaching outcomes; voice use patterns |  |  |  |  |  | Increased discussion and planning of voice use for coaching. |  |
|  |  |  | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  |  | Coaches still required to undertake demanding voice use, often responsive to others’ performance |
|  |  | Team | Team culture | Team priorities, culture, and climate; coaches’ voices shape team culture |  |  |  |  |  |  |  |
|  |  |  | Coaching roles | HC role; AC role; role definition |  |  |  |  |  | Increased clarity on role responsibilities associated with voice. |  |
|  |  |  | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Increased problem-solving of ongoing team challenges. | Variable and fluctuating player performance. |
|  |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes |  |  |  |  |  | Enhanced ability to support team performance during games. | Variable player performance; uncertain opposition performance. |
| 21. Players’ feedback on coaches’ voice use | 2 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 1 | 1 | 0 |  |  |  |
|  | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  |  |  |

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| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(21. continued)* |  | Team | Players | Players’ needs, reactions, and engagement; player-talk |  |  |  |  |  | Increased understanding of players’ experiences as coaches’ communication partners. | Coaches prioritized addressing other factors rather than actioning player insights. |
| 22. Players’ input and talk empowerment | 6 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 0 | 6 | 0 |  |  | Coaches still used potentially unsafe voice use patterns. |
|  |  |  | Vocal task demands | Coaching at training; coaching at games; broader vocally reliant coaching tasks |  |  |  |  |  | Coaches’ vocal workloads somewhat decreased when players led some team activities. | Coaches’ demanding voice use still required during teams’ performance critical times. |
|  |  | Team | Team culture | Team priorities, culture, and climate |  |  |  |  |  |  | Turbulent team climates influenced players engage in talk. |
|  |  |  | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Some players increased their contributions to team talk. | Players’ diversity in skills for vocally reliant team activities. |
|  |  | Club | Broader club characteristics | Club precariousness; club-performance expectations |  |  |  |  |  |  | Club precariousness and unfavorable climates affected players’ engagement in talk. |
|  |  |  | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  | Decreased instructing players to overcome communication breakdowns. | Coaches still engaged in voice use to support team overcoming communication breakdowns during play. |
| 23. Opportunities for players clarification of instructions | 1 | Activity | Voice as a tool for coaching | Voice for desired coaching outcomes; voice use patterns |  | 0 | 1 | 0 |  |  |  |
|  | Team | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  | Some players increased their input in team talk/ | Not obvious if all players were comfortable seeking clarification from coaches. |
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| *Supplementary Table 2 continued* |
|  |  | Vocal Ergonomic Factors Associated with Strategies a c |  | Appraisal d |  | Key Context Influences with Strategies a e |
| Strategies a | AI b | Categories | Topics | Specific Factors |  | S | SS | U |  | Facilitators | Ongoing Barriers |
| *(23. continued)* |  | Sport | Gameday competition | Coaches’ voices and gameday outcomes |  |  |  |  |  | Somewhat prevented coaches’ additional voice use associated with play breakdowns. | Communication breakdowns during gameplay (other teams’ actions, player mistakes). |
| 24. Ensuring players’ attention | 1 | Activity | Voice as coaching tool | Voice for desired coaching outcomes; voice use patterns |  | 0 | 0 | 1 |  |  |  |
|  |  |  | Vocal task demands | Coaching at training; coaching at games |  |  |  |  |  |  |  |
|  |  | Physical | Acoustic environments | Acoustic environments at training; acoustic environments at games |  |  |  |  |  |  | Continued presence of loud noise, others present in locations. |
|  |  | Team | Players | Players’ needs; players’ engagement and coaches’ voices; player-talk |  |  |  |  |  |  | Turbulent team climates. |
| 25. Further needs assessment for vocal ergonomic factors and strategies | 4 | All | All | All |  | 2 | 2 | 0 |  |  |  |
| *Note.* AC = Assistant coach. HC = Head coach. Voice use patterns = e.g., volume, pitch, tone. Away game = game occurring at another team’s court. a Strategies = considered action undertaken across teams to support vocally reliant systems participation [16, 31, 88, 89]. b AI = Action inquiries, number of teams exploring strategy.c Factors identified by participants as associated with strategy development, implementation, and evaluation. Categories = overarching organizational groups for cross-case findings. Each category comprises 1+ findings topics. Topics = main analytical and organizational clusters [31]. Factors = work system factors that influenced coaches’ voices (i.e., vocal ergonomic factors) [3, 13, 16, 20, 70]. d S = supportive strategies, SS = somewhat supportive strategies, U = unsupportive strategies. e Participants identified system attributes that functioned as both enablers and ongoing barriers when strategies were implemented. e Basketball stance = straight, torso bent forward, arms straight and on knees, neck flexed forward, chin thrust. |

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| **Supplementary Table 3: Collated strategy types** |
| Strategies | AI | Generation |  | Use |  | Appraisal |
| Dev. | Imp. |  | As des. | Mod | Not |  | S | SS | U |
| 1. Systematic hydration | 5 | 3 | 2 |  | 4 | 1 | 0 |  | 4 | 1 | 0 |
| 2. Additional vocal health insight discussions and SME advice | 1 | 0 | 1 |  | 0 | 1 | 0 |  | 0 | 1 | 0 |
| 3. Vocal rest | 4 | 2 | 2 |  | 4 | 0 | 0 |  | 1 | 3 | 0 |
| 4. Vocal warmup exercises | 4 | 2 | 2 |  | 1 | 2 | 1 |  | 0 | 3 | 1 |
| 5. Planning meetings | 1 | 0 | 1 |  | 0 | 1 | 0 |  | 0 | 1 | 0 |
| 6. Task modification when coach ill-health affected voice | 2 | 0 | 2 |  | 2 | 0 | 0 |  | 1 | 0 | 1 |
| 7. Pausing play before key information delivery | 1 | 0 | 1 |  | 1 | 0 | 0 |  | 0 | 1 | 0 |
| 8. Signals and gestures | 1 | 1 | 0 |  | 0 | 1 | 0 |  | 0 | 1 | 0 |
| 9. Postural needs assessment | 1 | 1 | 0 |  | 1 | 0 | 0 |  | 0 | 1 | 0 |
| 10. Apparel choices and postural considerations | 1 | 0 | 1 |  | 1 | 0 | 0 |  | 1 | 0 | 0 |
| 11. Avoiding voice use in basketball stance | 2 | 0 | 2 |  | 2 | 0 | 0 |  | 0 | 2 | 0 |
| 12. Avoiding voice use while squatting, drawing | 1 | 0 | 1 |  | 0 | 1 | 0 |  | 0 | 1 | 0 |
| 13. Seating in timeouts | 2 | 1 | 1 |  | 2 | 0 | 0 |  | 1 | 1 | 0 |
| 14. Reduced proximity between communication partners | 6 | 1 | 5 |  | 6 | 0 | 0 |  | 2 | 4 | 0 |
| 15. Modified huddle formations | 2 | 1 | 1 |  | 2 | 0 | 0 |  | 1 | 1 | 0 |
| 16. Voice amplification | 2 | 2 | 0 |  | 0 | 1 | 1 |  | 0 | 1 | 1 |
| 17. Move away from sound sources at games | 1 | 0 | 1 |  | 1 | 0 | 0 |  | 0 | 1 | 0 |
| 18. Changing training location engagement | 2 | 0 | 2 |  | 2 | 0 | 0 |  | 2 | 0 | 0 |
| 19. Coach peer-mentoring and problem-solving meetings | 1 | 0 | 1 |  | 0 | 1 | 0 |  | 1 | 0 | 0 |
| 20. Clarifying role responsibilities and vocal task delegation | 3 | 2 | 1 |  | 1 | 2 | 0 |  | 1 | 2 | 0 |
| 21. Players’ feedback on coaches’ voice use | 2 | 2 | 0 |  | 1 | 1 | 0 |  | 1 | 1 | 0 |
| 22. Players’ input and talk empowerment | 6 | 4 | 2 |  | 5 | 1 | 0 |  | 0 | 6 | 0 |
| 23. Opportunities for players clarification of instructions | 1 | 1 | 0 |  | 1 | 0 | 0 |  | 0 | 1 | 0 |
| 24. Ensuring players’ attention | 1 | 1 | 0 |  | 1 | 0 | 0 |  | 0 | 0 | 1 |
| 25. Further needs assessment for vocal ergonomic factors and strategies | 4 | 3 | 1 |  | 4 | 0 | 0 |  | 2 | 2 | 0 |
| Mean | 2.28 | 1.08 | 1.20 |  | 1.68 | 0.52 | 0.08 |  | 0.72 | 1.40 | 0.16 |
| SD | 1.62 | 1.15 | 1.08 |  | 1.68 | 0.65 | 0.28 |  | 0.98 | 1.38 | 0.37 |
| Total | 57 | 27 | 30 |  | 42 | 13 | 2 |  | 18 | 35 | 4 |
| *Note.* AI = Action inquiries, number of teams exploring strategy. Dev. = development stage. Imp. = implementation stage. As des. = used as designed. Mod = modified during use. Not = not used. S = supportive strategies. SS = Somewhat supportive strategies. U = unsupportive strategies. SD = Standard Deviation. |