Developing a Scale Measuring Perceptions of "Liveness" During ICT Augmented Performances Designed to Increase Accessibility on Site at Music Festivals

Adrian C. C. Bossey

Cornwall Business School, Falmouth University, Cornwall, UK

Potential audience members who are d/Deaf, disabled, or neurodiverse (AMDDN) face difficulties accessing music festivals, where live music performances are increasingly augmented with ICT, challenging perceptions of "classic liveness." Building on previous research relating to augmented formats and viewpoints more generally, this article proposes a liveness scale to measure audience perceptions of performances at music festivals that have been augmented to increase accessibility at music festivals for AMDDN. A Likert scale was developed, tested, and refined utilizing an adapted version of Gehlbach and Brinkworth's six-step process to specifically address on-site accessible augmentations. Overall, 282 responses were collected across four iterations of primary research from six music festivals. Discussions with the population of interest and expert validation preceded cognitive pretesting and pilot testing. Potential for ongoing use of the resultant scale on site at music festivals was recognized and opportunities identified for further scale development to explore AMDDN perceptions off site.

Key words: Liveness; ICT; Accessibility; d/Deaf; Disability; Neurodivergence; Performances; Music festivals

Introduction

Music festivals comprise concerts, featuring multiple performers, which are generally held outdoors and last several days (Shuker, 2022). In 2022, over 6 million people attended UK music festivals (McLennan, 2023) where audience members can interact with performers and other fans (Brown & Knox, 2017). As businesses that engage with society and stimulate social interaction, music festivals must address issues pertaining to equality, diversity, and inclusion (Calver et al., 2023) to enable a wide cross-section of audience members to attend. Doing so imbues music festivals with the potential to positively influence inclusion across society (Duignan, 2023) and reduce discrimination by stimulating understanding and empathy (Iannetta et al., 2023). However, during a period of rapid adoption of information and communication technologies (ICT), music festivals face challenges facilitating access

Address correspondence to Adrian Bossey, Cornwall Business School, Falmouth University, Penryn Campus, Penryn, Cornwall, TR10 9HE, UK. E-mail: adrianbossey@gmail.com

for potential audience members who are d/Deaf, disabled, or neurodiverse (AMDDN), which are compounded by a paucity of research on the topic (Calver et al., 2023; Chen & Yu, 2024).

In 2020/2021, 16 million people in the UK experienced a physical or mental health condition or illness lasting 12 months or more (House of Commons Library, 2022). A person who is disabled has "a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on (their) ability to do normal daily activities" (Equality Act, 2010, p. 6). The principal global cause of disability is neurodivergence (Feigin et al., 2020), which is defined as "Cognitive functioning that is not considered 'typical'" (Exceptional Individuals, 2023). In addition, over 5% of the world's population suffer from disabling hearing loss with hearing thresholds below 20 dB in both ears (World Health Organization, 2025) wherein d/Deafness is defined as profound hearing loss, causing little or no hearing (World Health Organization, 2025). Accessibility to live events for AMDDN comprises "measures put in place to address participation" (Finkel et al., 2019, p. 2).

While most accessibility measures enacted at music festivals are physical or systems based (Alvarado, 2022; Bossey, 2020), accessible ICT are increasingly being deployed to improve inclusion (Bossey, 2022; Lazar et al., 2015). Music festivals are "critical sites" for understanding these processes (Holt, 2016. p. 276) because they form a central element of live music sector (McKay, 2015). Experiences are cocreated by producers and attendees (Getz, 2018) and embedding this approach into event design can help address exclusion. Cocreating accessible music festivals incorporates discussion of individual perceptions around access requirements.

It is impossible to understand the full impact of any music performance on society without examining the "nature, practices and cognitions" of the audience (Waddell & Williamon, 2022, p. 228). Perception varies between individuals as "an idea, a belief or an image you have as a result of how you see or understand something" (Oxford Advanced Learners Dictionary, 2024). Generally, audience perceptions of what constitutes a successful live performance at a music festival will be influenced by the degree to which it feels authentic (Girish & Ching-Fu, 2017). Authenticity concerns "the quality of being genuine or true" (Oxford Learners Dictionary, 2024) and is informed at music performances by "producers, consumers, and selectors of music" (Askin & Mol, 2018, p. 181).

Accomplishing a sense of authenticity among audience members for live music events in an ICT-enhanced music industry is important. Audience members respond to varied factors when considering the authenticity of a live performance, including the artist's performance (Jaimangal-Jones, 2017), which can itself be influenced by real-time audience responses (Moelants et al., 2012; Radbourne et al., 2016). Audiences may also respond to "extra musical" factors such as the architecture of the performance space (S. O'Neill & Sloboda, 2017, p. 322) and consumer-to-consumer interaction (Sengoz et al., 2024). From a format perspective, it has been suggested that physical attendance may be more authentic than livestreamed attendance (Phillips & Krause, 2024) because the benefits of "immersion and a sense of community" may be harder to attain remotely (Hwang & Shaomian, 2022, p. 99).

In both colocated and remote/mediated performances, "liveness" can be conceived of as a "benchmark of authenticity" (Bennett, 2021, p. 175) within a set of factors that influence audience perceptions of authenticity during live music performances (Bossey, 2023a). Therefore, adoption of accessible ICT at music festivals may be influenced by the perceived "liveness" of the ICT augmentation to live music performances (Bossey, 2023a). During academic debate, a historical Oxford English Dictionary definition of liveness has been used, as "a performance, heard or watched at the time of its occurrence, as distinguished from one recorded on film, tape, etc." (Auslander, 2008, 2012; Kim, 2017; Bossey, 2023a). Over time, the scope of the term has broadened to incorporate "virtual liveness" (Sanden, 2013, p. 11), primarily related to audio and visual senses and "liveness 4.0" (Bossey, 2023b, p. 130) incorporating the senses of balance, heat, perception of body awareness, smell, taste, and touch.

Responding to the six-step scale development process designed by Gehlbach and Brinkworth (2011) this research builds on pretesting of three scales of perceptions of liveness in performances at, or emanating from, music festivals by Bossey (2023a). The resulting pilot scales explored

attendee's perceptions of authenticity pertaining to liveness across formats, audience sizes, and audience viewpoints for live performances. Because the original pilot covered general augmentations, Bossey (2023a) identified potential for developing a separate scale that explicitly focused on ICT augmentations intended to enhance accessibility for AMDDN. This recommendation implies the need for a discrete, more contextualized, scale focusing on completely different augmentations to earlier work. Therefore, this new research addresses the thesis that: A liveness scale can be developed to measure audience perceptions of augmented performances designed to increase accessibility for AMDDN on site at music festivals. Following a literature review, engagement with the population of interest, item development, and expert validation, a prepilot test took place. Thereafter, pilot iterations were trialed at five music festivals, before additional focus group and expert input informed a final scale.

Literature Review

ICT-Enhanced Performances and AMDDN

The term ICT incorporates a variety of resources or means "to transmit, store, create, share or exchange information" UNESCO (2019, p. 1). Increasing usage of ICT has radically changed all contexts within which music is distributed and consumed (Maaso, 2018) while driving new business models for the live music industry incorporating blended live and mediatized experiences (Connock, 2024; Nilsson, 2020). ICT is already changing audience expectations of music, while high rates of adoption of ICT are likely to grow further in relation to live music (Frenneaux & Bennett, 2021; Kjus & Danielsen, 2016). The consumer innovation decision process can be used to consider adoption of ICT augmentations and incorporates early stages of consumer "acceptance" or "resistance" (Nabih et al., 1997, p. 190) and active "rejection" (Kleijnen et al., 2009, p. 345). Rejection of ICT at music festivals can emanate from both consumers and "producers/selectors" (Askin & Mol, 2018, p. 168), with, for example, some music festivals introducing "no-phones policies" (Oltermann, 2024). Contextual considerations are important to

event experiences (Rust, 2020) so music festivals need to respond to a wide range of access needs to become fully accessible (Youth Music, 2024). Existent and future ICT augmentations have great potential to increase accessibility at music festivals for AMDDN.

Inevitably, variations in personal levels of hearing loss can alter the experience of live music for people who are d/Deaf or hearing-impaired (British Deaf News, 2020) although d/Deafness can increasingly be mitigated to some extent by ICT (Jensen et al., 2023). Established examples of this include closed captions providing time synchronized text (Mahoney, 2023) and hearing loops supplying wireless signals to hearing aids (Hearing Link Services, 2023). More recent developments include real time subtitles sent to an individual's mobile device at an event (XRAI Glass, 2024) and haptic interventions that enable d/Deaf audiences to feel musical performances (Robertson et al., 2015). For example, providing 5G-enabled Music: Notimpossible haptic suits at Mighty Hoopla Festival (Vodaphone, 2022).

Music is an "essential part of life" for many people who are blind or partially sighted (Royal National Institute of Blind People, 2024). Their access to live music festival performances could be improved through live audio description, a commentary for people who are blind or visually impaired utilizing headphones provided by the venue (Audio Description Association, 2024) or through streaming platforms (Tamasauskas, 2023). Neurological conditions can stimulate feelings of anxiety, so augmentations for AMDDN at music festivals include sensory calm spaces that provide sound, texture, and visual stimulation, to help manage the heightened senses and emotions of live events (Access All Areas, 2024). Tailored music events specifically designed to appeal to people who are neurodivergent are also emerging (Konemann, 2024).

Liveness

The value of "liveness" in music performance needs further investigation (Phillips & Krause, 2024). Academics studying liveness have adopted opposing ideological stances. Phelan (1993), Dixon et al. (2015), Fischer-Lichte (2008), and Long

(2016) contended that a performance can only be considered live at the time and physical location it occurs, during a shared meeting between artist and fan (Tsangaris, 2020). This idea of "classic liveness" rejects ICT augmentation and can still be detected among audiences for music festivals (Bossey, 2019) and within music venues (Behr et al., 2016). However, an opposing position, that ICT has altered the conventions of live performance (Bennett, 2015), draws on Couldry (2004) and Auslander (2008) to reject classic liveness. Auslander (2012) stated that liveness does not rely upon "either the presence of living human beings before each other or physical and temporal relationships" (p. 6). This position disconnected the physical and/or time-based colocation of a musical artist with their audience from the liveness of a mediatized performance and was supported by Sanden (2013) and Meyer-Dinkgraäfe (2015). Furthermore, in removing the necessity of human performers, Auslander and others introduce the idea that a range of nonliving performers could deliver "live" performances. Ranging from holograms of dead musicians (Forbes, 2021) to Vocaloid performers at on-site music festivals (Michaud, 2022) and avatars performing in Second Life (Collins, 2013), these new formats prompt audiences to reimagine their perspectives of liveness (Gagen & Cook, 2016).

It is "not surprising" that liveness attains new characteristics (Van Es, 2017, p. 18), which in turn drive new perceptions of liveness from audiences with, for example, attitudes towards liveness online changing during the COVID19 pandemic (Kanga, 2022). Furthermore, liveness more broadly "continues to expand, mediated by new technology" (Keith et al., 2014, p. 237), which has the potential "to subvert the perception of liveness altogether" (Sanden, 2019, p. 178). Concepts of "virtual liveness" (Sanden, 2019, p. 180) and "liveness 4.0" (Bossey, 2023b, p. 130) have extended the argument in favor of liveness within mediatized music content to incorporate ICT augmentation targeting the full range of human senses. These concepts implicitly acknowledge that audiences at live music performances increasingly inhabit a "mixed world" comprising geographically colocated and mediated on and off stage experiences. Herein, audience members will likely cocreate these new environments by responding positively to performances

they perceive to be "genuine" (Maxwell Keller, 2023) and/or negatively to formats where they do not feel authentically "present" (Dixon et al., 2015, p. 101). Furthermore, "there is no reason to believe that this intermingling of live and mediated forms will decrease in the years to come" (Danielsen & Kjus, 2019, p. 729), perhaps diminishing individual human bodies to mere "experience machines" controlled by others for profit (Vlachos, 2023). Given rapid changes in ICT augmentation of event experiences, academic exploration of liveness relating to live music will likely grow.

Within academic study, perceptions of liveness need to be "contextualized rather than generalized" (Anderton & Pisfil, 2021, p. 5) to draw meaningful conclusions as to their relevance to performers or audiences. For some performers at music festivals, this might involve using specific technologies, such as audio-visual interactive systems (Waite, 2019) within performances. This could be achieved for audiences by, for example, considering "vocaloid liveness" (Karki, 2021, p. 137) or holographic performances from dead musicians, where "liveness and deadness can be mutually compatible" (Forbes, 2021, p. 166). Furthermore, relative audience responses to liveness in relation to different forms of ICT augmentation represent fertile ground for further exploration (Matthews & Nairn, 2023). Music festival organizers could make informed decisions regarding the potential deployment of ICT-enhanced format innovations at their music festivals based on understanding perceptions of liveness relating to their specific market segment. It follows that the same approach could be adopted to try to understand the likely uptake of ICT augmentations designed to increase accessibility at any given music festival, wherein liveness scales could be used to measure perceptions in AMDDN.

Scale Development and Music-Based Comparators

A variety of approaches to scale development processes have been described by academics, including Churchill and Peter (1984), Boateng et al. (2018), and Gehlbach and Brinkworth (2011). The latter process consists of six steps: First, a *literature review* to contextualize and define the construct in relation to literature and identify any existing measures or related constructs that could

be relevant. Second, *interviews and focus groups* need to be held with the population of interest. These will help align the initial construct with the likely terminology, categorization, and/or contextual understanding of proposed sample groups of respondents. Third, *synthesizing the literature review with interview/focus group data* to resolve any emergent disparities between respondent and academic understanding of the construct while informing the development of indicators for the construct. Fourth, *developing items* that are both meaningful to likely respondents and adequately represent the proposed indicators. Fifth, *expert academic validation* from authorities in the field to identify any significant omitted indicators, establish the construct relevance of individual items and provide information on the clarity, language complexity, and other potential issues around individual items. Penultimately, *cognitive pilot testing*, whilst this generally necessitates interviews with potential respondents, individual approaches differ. Finally, *pilot testing* which addresses any items that remain problematic using data from a larger sample.

Shorter scales are considered more efficient, so determining the number of items is an important consideration. Having established an item pool, ideally at least twice as long as the desired scale, several iterations of pilot testing will be required to arrive at a core group of items (Gehlbach & Brinkworth, 2011). Final items must correlate with each other while contributing significantly to the final construct and being internally consistent (Boateng et al., 2018). Items should be inoffensive, avoid bias, and function well for a sample drawn from the population of interest (Gehlbach & Brinkworth, 2011). While sample size will be constrained by circumstances, once devised, to ensure reliability, scales must contain at least 10 responses per item, with 5-point Likert scales recommended for unipolar items (Boateng et al., 2018).

It is essential to ensure information regarding live music performances is available in accessible formats (Castle et al., 2022). Designing for accessibility requires the use of "plain English," which is particularly important for users who are d/Deaf or hard of hearing (Pun, 2016). Artificial terminology that attempts to avoid common words or phrases may not be helpful in this context (Disabled Solicitors Network, 2024), although concise items are easier to understand (Churchill & Peter, 1984). Pictorial and symbolic visual supports have been proven to remove barriers to accessing knowledge for children with disabilities (Foster-Cohen & Mirfin-Veitch, 2017).

A comparator "Event Experience Scale" was identified that measures general event experiences and comprises dimensions of "affective engagement, cognitive engagement, physical engagement and experiencing newness" (Geus et al., 2015, p. 274). The scale has been used in subsequent studies including Richards (2020) who considered seven international events to detect generic dimensions of event experience. While this 18-item scale was devised to cover events and experiences, including those within festival settings, it predominantly considers physical events and does not specifically incorporate the concepts of liveness or accessibility.

The comparator "Live Music Motivation Scale" (Mulder & Hitters, 2021, p. 360) measures 17 motivations to attend physical live music performances and explores differences between concert and festival motivations but does not relate to perceptions of liveness. The "Social Experience of a Concert Scales" (K. O'Neill & Egermann, 2022) measures the social experience of a Western art music concert, but not liveness. More generally, the "Music Experience Questionnaire" (Werner et al., 2006, p. 331) considered aspects of everyday experiences of music that extend far beyond attendance at music festivals and do not include accessibility or liveness. More recently, Yang (2023) explored the audience experience for online concerts. Furthermore, several psychometric scales relating to music have been developed, for example to identify individuals with strong emotional responses to music (Sandstrom & Russo, 2013) or consider the benefits of listening to music (Groarke & Hagan, 2020) and for use in listening experiments across music psychology (Senn et al., 2023); however, these are not directly measuring experiences at music festivals. Overall, no comparators were identified measuring perceptions of liveness during augmented performances designed to increase accessibility at music festivals.

Methodology

The research focused on live music festivals and adapted the Gehlbach and Brinkworth (2011)

scale development process, to enable an iterative approach where some steps were repeated. The principal investigator's prior knowledge of the live music industry, alongside a literature review, enabled an abductive approach. Hereby, ICT augmentations for AMDDN, liveness, and scale development/comparators were constructed as a conceptual framework. Falmouth University institutional research ethics processes were used to approve the research. Identified limitations of the research are the relatively small number of both music festivals and respondents in each cohort, while the scope for considering perceptions of liveness was restricted to augmentations designed to increase accessibility for AMDDN.

Initial scale development (Boateng et al., 2018) comprised preliminary item development, informed by a literature review to identify existing measures and related constructs, alongside consideration of the audience viewpoints scale (Bossey, 2023c). Engagement with accessibility specialists supported domain identification and consideration of content validity. While academics disagree over the nature of constructs (Weber, 2021) the underlying definition utilized herein is "properties in general of a class of things in the real world" (Bunge, 1977, p. 116). Thereafter, academic feedback was obtained to crystalize understanding of the construct and inform indicator development. This enabled the creation of an initial pretest liveness scale (see Table 1) to test a pool of 11 items, using a 5-point Likert scale embedded in a structured online e-mail questionnaire on Microsoft Forms.

This quantitative approach was used to provide breath of information from a range of respondents (Muijs, 2011). Aligning with Boateng et al. (2018) a 5-point Likert scale was adopted using headings of *strongly agree*, *agree*, *neutral*, *disagree*, and *strongly disagree*. Outcomes can be coded with agreement corresponding to "acceptance" and disagreement corresponding to "resistance" using Nabih et al.'s (1977) conceptual framework of innovation responses.

The phrase "an authentic 'live' music performance" was initially adopted, in acknowledgment that "liveness" is not a commonly understood term. All iterations of the scale contained closed, quantitative questions. These questions related to age, gender, d/Deafness/hearing impairment and asked about the predominant reason for attending music festivals. Here, respondents indicated whether they attend as a paying audience member, as part of their job, or whether they do not attend live music performances. This approach was designed to facilitate a recoding exercise responding to Askin and Mol (2018). Respondents self-identifying as paying audience members can be coded as "consumers" and those attending for work correspond to "producers/selectors," while respondents not attending music festivals are coded as "neither."

Pretesting occurred during music performances programmed by the Live Audience Accessibility & Augmentation (LAAA) Project at Falmouth University in May 2023. LAAA installed the BEAT BLOCKS "multi-sensory interactive flooring system" (Beat Blocks, 2022) to generate audience

Table 1
Pretest Scale Questions

Please indicate the extent to which you feel the following perspective of a performance at a music festival would represent an authentic "live" music experience.

Experiencing the performance on site, in real time, without augmentation
Experiencing the performance on site through a handheld device
Experiencing the performance on a big video screen on-site
Experiencing the performance while accessing immersive subtitles on a big video screen on-site
Experiencing the performance on site while utilizing hearing loops through your hearing aid
Experiencing the performance on site while standing on an interactive haptic flooring system which transforms sound into felt vibration
Experiencing the performance on site while wearing an interactive haptic vest which transforms sound into felt vibration
Experiencing the performance on site, in real time, without augmentation while talking to friends
Experiencing a live stream of the performance remotely at a cinema
Experiencing a live stream of the performance remotely at home with friends
Experiencing a live stream of the performance remotely at home alone

Table 2

Initial Pilot Scale Questions

Please indicate the extent to which you feel the following on-site perspective of a music performance at a music festival represents an authentic "live" event.

Experiencing the performance without augmentation
Experiencing the performance with sign language interpretation
Experiencing the performance while accessing immersive subtitles on a big video screen
Experiencing the performance while utilizing hearing loops through a hearing aid
Experiencing the performance while standing on an interactive haptic flooring system which transforms sound into felt vibration
Experiencing the performance while wearing an interactive haptic vest which transforms sound into felt vibration

experiences of a haptic dance floor (Bossey, 2023c). Student volunteers supported data collection during live performances using clipboards featuring information about the research including a QR code that linked directly to the online questionnaire. Postevent, volunteers provided reflective verbal feedback regarding the research process generally and respondent comments regarding the scale, which was collated by the primary investigator. Results from this respondent feedback, alongside additional reaction from research assistants and two expert reviewers, was used to recheck language/understanding and inform three phases of pilot testing.

Phase One. An initial pilot scale (see Table 2) was deployed to collect empirical evidence at Boomtown Fair (BF) music festival in August 2023 and the Deaf Rave Festival (DRF) in October 2023. Attendees at both events were offered the opportunity to wear a Woojer Vest 3, which vibrates "precise frequencies throughout your entire body" (Woojer 2024) during a DJ and MC performance by Deaf Rave, a music production company supporting d/Deaf, hearing, and disabled performers (Deaf Rave, 2024). Results and researcher/respondent feedback were collated to inform on-going development of the scale. Furthermore, to test potential outcomes, all responses obtained during this phase were tested to ascertain asymptotic significance (p value) using nonparametric chi-square testing with SPSS and assuming a null hypothesis that all categories would be equal.

Phase Two. A revised second pilot scale was deployed in May 2024 at Cheltenham Jazz Festival (CJF) (see Table 3) during the Live Audience Accessibility & Augmentation 2 Beat Blocks (LAAA2BB) project. LAAA2BB measured audience and policy maker perceptions of the BEAT BLOCKS haptic dance floor, which was designed to facilitate accessibility for audiences with

Table 3

Second Pilot Scale Questions

Please indicate the extent to which you feel the following on-site perspective of a music performance at a music festival feels 'live' (if a question does not apply to you, please leave your answer blank)

Experiencing the performance without augmentation
Experiencing the performance by watching a big video screen on/near the stage
Experiencing the performance with sign language interpretation
Experiencing the performance while accessing immersive subtitles on a big video screen
Experiencing the performance while watching/filming through a mobile device
Experiencing the performance augmented with instant real time subtitles on your mobile device
Experiencing the performance while utilizing hearing loops through a hearing aid
Experiencing the performance while standing on an interactive haptic flooring system which transforms sound into felt vibration
Experiencing the performance on-site while wearing an interactive haptic vest which transforms sound into felt vibration

impairments (Beat Blocks, 2022). Feedback was sought from experts in the field and students who contributed to this field research, to enable item refinement.

Phase Three. A further revised third pilot scale (see Table 4) was deployed for field research at additional LAAA2BB installations at Meltdown Festival (MF) on London Southbank and Tropical Pressure Festival (TPF) in Cornwall during Summer 2024. This fourth iteration of the liveness scale was tested using an additional clarity scale that was completed by respondents who had already filled in the liveness scale. Respondents were asked to rate how comprehensible each item was, from *not at all*, *slightly*, *somewhat*, *quite*, and *extremely* understandable.

Phase Four. A final fourth pilot scale (see Table 5) was tested with two off-site focus groups. This enabled further reflection which informed the production of the final version of the proposed scale (see Fig. 1).

Results

The literature review of existing measures and related constructs identified a gap in direct comparators. Taking the audience viewpoints scale (Bossey, 2023a) as a starting point, synthesization

Table 4

Third Pilot Scale Questions

My on-site experience during a music performance feels 'live' . . . (if a question does not apply to you, please leave your answer blank)
Without using additional technology
Watching/filming through my mobile device
Watching on a big video screen on/near the stage
Accessing immersive subtitles on a big video screen
Accessing real time subtitles on my mobile device
Accessing sign language interpretation
Accessing sign language interpretation on a big video screen
Utilizing hearing loops through my hearing aid
Standing/sitting on an interactive haptic flooring system which transforms sound into felt vibration
Wearing an interactive haptic vest which transforms sound into felt vibration

Table 5

Fourth Pilot Scale Questions

My experience of a music performance as it occurs at a music festival, feels "live?. . .
Without using any additional technology
Watching it on a big video screen
Accessing immersive subtitles on a big video screen
Accessing sign language interpretation
Accessing sign language interpretation on a big video screen
Filming it using my mobile device
Watching it on another audience member's mobile device
Accessing real time subtitles on my mobile device
Accessing hearing loops through my hearing aid
Using an interactive haptic flooring system which transforms sound into felt vibration
Wearing an interactive haptic vest which transforms sound into felt vibration

of the literature review with focus group data was carried out. Input to an expert reference panel from the population of interest informed domain identification alongside consideration of indicators, leading to the addition of four new items. Specific accessible ICT-enhanced formats were introduced comprising immersive subtitles, hearing loops, haptic flooring, and haptic vests. In alignment with Bunge (1977), the proposed construct for the scale was the liveness of ICT augmentations to musical performances.

Expert academic validation was obtained from six colleagues, based across four universities, to further develop both construct and indicators. Key feedback included that all the questions: "explicitly foreground the notion of 'visuals' (watching/viewpoint) in the proposition/perspective through which the relative level of 'liveness' is considered. (Perhaps) consider questions that do not place the primacy of the experience to the visual either through the question itself or the language used" (Academic 1). This observation was addressed by replacing the term "watching" with "experiencing." Furthermore, Academics 2 and 3 noted that "music venues and music festivals, as settings generate very different experiences" and so a proposed amendment to site both settings was removed. Academic 4 observed that watching/filming in question (b) "feel like two questions/experiences," questioned the video screen "at the side of the stage" in question (c), and noted the need to clarify what haptic technologies

Experiencing a music performance as it happens at a music festival, feels 'live'...	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	DOES NOT APPLY TO ME
Without using any additional technology						
Watching it on a big video screen						
Watching immersive subtitles on a big video screen						
Watching sign language interpretation without using technology						
Watching sign language interpretation on a big video screen						
Filming it using my mobile device						
Watching it on another audience member's mobile device						
Accessing real time subtitles on my mobile device						
Accessing hearing loops through my hearing aid						
Accessing audio description through infrared headsets						
Using an interactive haptic flooring system which transforms sound into felt vibration						
Wearing an interactive haptic vest which transforms sound into felt vibration						

Figure 1. Final liveness scale questions.

do. In response the terminology used relating to handheld devices, video screens, and haptics was changed. Academic 5 questioned responses to scenarios that "do not apply to me" and asked whether there is scope to add to add "don't know/ not applicable" as an option. This did not feel possible within the format of a Likert scale for LAAA, so was listed for future reference. Academic 6 did not suggest any additional changes to those already made by others. Finally, the format of the Microsoft forms questionnaire was revised by incorporating individual questions for each item instead of one table for the whole Likert scale, to facilitate a better experience for mobile devise users.

Pretesting

Unfortunately, response rates at the initial LAAA Project were conversely affected by lower than expected audience numbers at one performance due to stringent security surrounding a royal visit to LAAA. In total 76 completed liveness questionnaires were collected, from which 69 respondents agreed to their inclusion in the research. Of these respondents, 17 were under age 20, 29 were aged 20–29, 9 aged 30–39, 9 aged 40–49, 3 aged 50–59, and 2 aged 60 and over. Furthermore, 34 were male, 34 female, 0 nonbinary, 1 gender fluid, and 0 preferred not to say; 17 respondents self-identified as d/Deaf or hearing impaired. Using Askin and Mol (2018), 35 respondents were coded as attending live music events as "consumers," 24 as "producers/selectors," and 10 as "neither." No further testing was attempted because the overall sample size was under 100.

Reflective feedback from student volunteers was informed by respondent comments, collected to revisit language/understanding. This included a strong sense that some questions were overly complicated/"too academic" to complete in a live music environment. Furthermore, some respondents said there were too many items to consider during a live event and others questioned the inclusion of items that related to remote live streaming formats and/or that did not specifically address accessibility. Additionally, the item relating to "experiencing the performance on-site, in real time, without augmentation while talking to friends" was noted as being both complicated to understand and

potentially something of a "red herring." Research assistants reported challenges to the completion of the form that related to the sole use of a digital questionnaire. These included the low strength of broadband signals on site and a tendency for attendees to say they would complete the questionnaire later, against limited evidence of this actually happening postevent.

Taking these findings into account, the focus of the next iteration of the scale was tightened to on-site items. This was stated in the overarching Likert scale question, to help simplify the remaining items. Other item wordings were reviewed for simplicity, to improve understanding. The overall number of items was reduced from 11 to 6 and items relating to "talking to friends" and "experiencing the performance on site through a handheld device" were removed entirely. Sign language interpretation was added as an indicator for the construct (although levels of ICT augmentation were not specified). Consequently, all but one remaining item focused on specific augmentations designed to address accessibility. Finally, an expert in accessibility was consulted and paper versions of the questionnaire were developed to provide an alternative to a Microsoft forms version in case of poor broadband reception.

Phase One

In total 141 respondents completed liveness questionnaires during this first iteration of pilot testing, with 54 from BF and 87 from the DRF. However, 14 respondents did not agree to take part in the research and were removed from analysis. Of the remaining 127 respondents, 16 were under age 20, 57 aged 20–29, 21 aged 30–39, 18 aged 40–49, 12 aged 50–59, and 2 aged 60 and over. By gender, 60 respondents were male, 64 female, 4 nonbinary, 0 gender fluid, and 1 preferred not to say; 63 respondents considered themselves d/Deaf or hearing impaired, 47 considered themselves to be disabled, and 37 considered themselves as neurodivergent. Using coding by Askin and Mol (2018), 88 respondents attended as "consumers," 24 as "producers/selectors," and 10 as "neither." All 127 sets of responses were tested for goodness of fit, with each scoring under 0.05 to confirm statistical significance.

Detailed analysis of the responses obtained against individual items will be considered under separate research into haptic vests. Generally, high levels of consumer innovation acceptance (Nabih et al., 1997) were identified around potential for haptic technology to improve appreciation of the musical performance, senses of access, inclusion, and belonging/community. Over 85% of respondents accepted haptic vests offer authentic "live" music experiences and 81% of respondents that provision of haptic vests would positively influence their attendance at future music festivals. Overall, the proposition that haptic technologies could enhance perceptions of liveness for some attendees was supported, as was the paradigm of "liveness 4.0" (Bossey, 2023b).

Carrying out field research in the crowded, noisy environments of both music festivals proved challenging and providing the researchers with ear protection further reduced their ability to hear respondents. While BSL translation was supplied within the team at the DRF, usage was complicated by the dark and very busy nature of the event, making BSL communication harder. Therefore, the need to request a quiet space for attendees to complete questionnaires during field research was identified.

Additional expert feedback identified concerns that foundational augmentations were missing from the scale, so items relating to "watching a big video screen" and "watching/filming through a mobile device" were reinstalled. A missing indicator/item around using instant real-time subtitles through mobile devices was identified and added. The wording for the six items was deemed to be sufficient; however, the term "represents an authentic 'live' event" was identified as being overly complex and was recommended to be replaced with "feels 'live.'"

Phase Two

A small cohort of 15 respondents completed a paper version of the revised iteration of the scale at CJF. While all respondents agreed to take part in the research, the size of the cohort precluded further testing of potential outcomes from this version of the scale. Nevertheless, feedback was obtained from academics, experts from the population of

interest, and students collecting the data to enable further simplification of the items and check for omissions. Specifically, this pertained to the continued use of academic language featuring relatively complex terms including "the extent to which," "on-site perspective," and "without augmentation." Because this terminology proved challenging for respondents, it was removed from the next iteration of pilot testing. Items were shortened where possible and their order was amended to a more logical sequence. Additional feedback identified the desirability of providing visual prompts for each question, although it was not possible to generate these in time for phase three.

Phase Three

Two cohorts comprising 20 respondents from MF and 30 from TPF completed the third iteration of pilot testing. It was decided not to analyze these responses. However, a further 25 cognitive pilot testing clarity responses were also obtained during this phase, comprising 14 from MF and 11 from TPF. These were analyzed against percentage responses for "not understandable/understandable" groupings, which showed the clearest items related to "without using additional technology" and "an interactive haptic flooring system." The least clear item was "accessing sign language interpretation on a big video screen" while the lowest responses related to hearing loops and haptic vests. In additional written comments, it was noted that contributory factors to augmented live experiences include the size of video screens and approach of BSL signers. There was one interesting request for a specific form for carers. Several respondents did not feel that an item applied to them so left it blank and added an explanatory note. Therefore, the (earlier) suggestion from academic reviewers to adopt an additional "does not apply" column was adopted for future questionnaires.

Despite being requested, no quiet room was provided at MF to complete the cognitive pilot testing and this made collecting data in the middle of a noisy and crowded venue particularly difficult. This was addressed at TPF where provision of a quiet space coincided with an increase in positive responses to the clarity responses. Feedback from field researchers and respondents at both festivals underlined the importance of this provision.

Final Iterations

Following additional expert validation, a fifth iteration was devised and piloted with a sample of 12 respondents in two focus groups (see Table 5). Items were reordered and, in some cases, reworded. The item "watching/filming through my mobile device" was divided into two separate items. The qualification "on/near the stage" was deemed superfluous and removed from the item "watching on a big video screen." Using the Likert scale, very low levels of disagreement were measured for the prompt "this question feels understandable to me," with only three items registering any disagreement: "Without using any additional technology" (10%), "accessing immersive subtitles on a big video screen" (10%), and "accessing sign language interpretation" (10%).

Discussion within the focus groups identified a need to reword the overarching question to replace the term "as it occurs at . . ." with "as it happened during. . . ." The term "watching" was identified as being easier to comprehend for items relating to video screens, so two items were amended. Item four was further amended to "watching sign language interpretation without using technology" to clarify the lack of augmentation. An additional round of validation occurred with two experts in accessibility, which identified the need to separate "audio description through infrared headsets" from the more general "hearing loops" items and reiterated the desirability of visual prompts. Thereafter, a final iteration was produced containing 12 items with associated visual icons. Inspired by Hidden Disabilities Sunflower (https://hdsunflower.com/uk/), nine new icons were designed to complement three appropriate existing icons and added to the final scale (see Fig. 1).

Discussion

Gehlbach and Brinkworth (2011) anticipated their scale development process would be modified by other academics and acknowledged varying approaches to cognitive pilot testing. Running several iterations of the scale development steps (Gehlbach & Brinkworth, 2011) supported a reflective approach. Recognizing the need to contextualize perceptions of liveness (Anderton & Pisfil,

2021), significantly adapting a generalized liveness scale (Bossey, 2023a) enabled learning from previous pilot testing to be applied to the first three steps. Obtaining feedback from accessibility experts, while rejecting an entirely interview-centric approach to cognitive pilot testing enabled a "best practice" process of co-design with AMDDN (Getz, 2018). Redesigning and replacing items during pilot testing acknowledged speed and extent of change/adoption of ICT by music festivals (Maaso, 2018). Adopting three phases of pilot testing acknowledged the importance of contexts (Rust, 2020) and helped mitigate challenging field-testing environments. Key issues during scale development included using "plain," accessible English, the overall number of items, potential for visual prompts, and on-site challenges to field research.

Following feedback regarding clarity of language, an iterative approach to tweaking item wording responded to the importance of using "plain" English (Pun, 2016). Potential issues with accessible terminology involving the term "watching" and concept of "viewpoints" were identified during academic validation. These appeared valid and were addressed during pretesting and at the first stage of pilot testing. However, respondent feedback identified issues around understanding linked to alternative terminology (accessing) so the term "watching" was reinstated in Phase Two and more significantly in the final iteration. These amendments acknowledge that watching is the most common terminology relating to using screen-based media and may avoid utilizing a form of artificial terminology (Disabled Solicitors Network, 2024).

Because scales with lower numbers of items are more efficient (Gehlbach & Brinkworth, 2011) and acknowledging the context for field research, the initial intention was to develop a final scale comprising 6 items from a pool of 11 potential items to align with Gehlbach and Brinkworth (2011). However, during the pilot phases iterative feedback led to two new items being added, two earlier items returned, and two decoupled. Furthermore, items were reordered to ensure flow and consistency (Boateng et al., 2018). The final scale contains 12 items from an item pool of 17 potential items, less than double the scale. Although this does not comply with Gehlbach and Brinkworth (2011), two other items were prediscounted from the earlier

audience viewpoints scale (Bossey, 2023a), which may offer some mitigation.

There are no visual prompts in comparators the Event Experience Scale (Geus et al., 2015), the Live Music Motivation Scale (Mulder & Hitters, 2021), the Social Experience of a Concert Scales (K. O'Neill & Egermann, 2022), or the Music Experience Questionnaire (Werner et al., 2006). However, both interviews/focus groups with the population of interest and expert validation identified the possible benefits of adding visual terminology to each item. Therefore, in alignment with Foster-Cohen and Mirfin-Veitch (2017), symbolic visual supports have been designed to support the final iteration of the scale. It is hoped this might encourage similar approaches to increasing accessibility (Castle et al., 2022) in documentation relating to live music.

The identified on-site challenges to field research at music festivals prompted questions regarding the feasibility of collecting questionnaire-based data and explored whether qualitative methods might be useful in future research projects. For example, participatory research approaches can be effective for social research to understand the lived experience of AMDDN (Bergold & Thomas, 2012). However, the liveness scale is not solely designed for use on site at music festivals and can be effectively deployed in other contexts in response to the likely growth in ICT augmentation of live music (Frenneaux & Bennett, 2021; Kjus & Danielsen, 2016).

Results suggest that the final liveness scale can be used to reliably measure attendee perceptions of liveness at music festivals. The ability to measure audience cognitions in this way is intended to help address the lack of research into accessibility (Calver et al., 2023; Chen & Yu, 2024) by providing an additional research tool. Scale usage by researchers could help generate social impact (Waddell & Williamon, 2022) by verifying perceptions of liveness regarding specific augmentations from the community of interest. This could help drive uptake of accessible ICT at music festivals, enhancing their capacity to positively influence inclusion (Duignan, 2023) and build understanding (Iannetta et al., 2023) across society.

Conclusion

Responding to Bossey (2023a), a liveness scale was produced to specifically consider on-site viewpoints for AMDDN of ICT-augmented performances designed to increase accessibility at music festivals. Following a literature review, an adapted version of Gehlbach and Brinkworth's (2011) scale development process was adopted. Several iterations of interviews/focus groups, item development, expert validation, cognitive pilot tests, pretests, and pilot testing were carried out. This iterative approach countered speed of change, challenging field-testing environments, and the complex nature of liveness.

The scale development process enabled the identification of important considerations around adopting "plain" English, moderating items, and incorporating visual prompts. In total, 282 completed liveness questionnaires were received during field tests at five music festivals and 12 from two final focus groups. A further 35 clarity responses were also obtained alongside expert feedback from 6 academics and 6 accessibility experts. The findings from the research support the thesis that a liveness scale can be developed to measure audience perceptions of augmented performances designed to increase accessibility for AMDDN on site at music festivals.

Future research could deploy the scale at different music festivals or to larger cohorts of respondents. Alternatively, researchers could develop additional scales to address perceptions of liveness from remote locations and/or during augmented theater arts performances.

ORCID

Adrian C. C. Bossey: https://orcid.org/000-0002-9874-6323

References

Access All Areas. (2024). *How live events should adapt for neurodiverse music fans.* Access All Areas. https://accessaa.co.uk/how-live-events-should-adapt-for-neuro-diverse-music-fans/

Alvarado, K. (2022). Accessibility of music festivals: A British perspective. *International Journal of Event and Festival Management, 13*(2), 203–218. https://doi.org/10.1108/ijefm-12-2020-0082

Anderton, C., & Pisfil, S. (2021). *Researching live music: Gigs, tours, concerts and festivals*. Focal Press. https://doi.org/10.4324/9780367405038

Askin, N., & Mol, J. (2018). Institutionalising Authenticity in the digitized world of music frontiers of creative industries: Exploring structural and categorical dynamics

research. *Sociology of Organizations, 55*(1), 159–202. https://doi.org/10.1108/S0733-558X20180000055007

Audio Description Association. (2024). *What is audio description?* https://www.audiodescription.co.uk/

Auslander, P. (2008). *Liveness—Performance in a mediatized culture*. Routledge.

Auslander, P. (2012). Digital liveness: A historico-philosophical perspective. *PAJ Journal of Performance and Art, 34*(3), 3–11.

Beat Blocks. (2022). *The Beat Blocks experience*. https://www.beatblocks.co.uk/

Behr, A., Brennan, M., Cloonan, M., Frith, S., & Webster, E. (2016). Live concert performance: An ecological approach, *Rock Music Studies, 3*(1), 5–23. https://doi.org/10.1080/19401159.2015.1125633

Bennett, R. J. (2015). Introduction. In A. C. Jones & R. J. Bennett (Eds.), *The digital evolution of live music*. Chandos Publishing.

Bennett, A. (2021). Live . . . as you've always heard it before—Classic rock, technology, and the re-positioning of authenticity in live music performance. In C. Anderton & S. Pisfil (Eds.), *Researching live music: Gigs, tours, concerts and festivals* (pp. 170–182). Focal Press. https://doi.org/10.4324/9780367405038-13

Bergold, J., & Thomas, S. (2012). Participatory research methods: A methodological approach in motion. *Historical Social Research*, *37*(4), 191–222. https://doi.org/10.17169/fqs-13.1.1801

Boateng, G., Neilands, T., Frongillo, E., Melgar-Quinonez, H., & Young, S. (2018). Best practices for developing and validating scales for health, social, and behavioural research: A primer. *Frontiers in Public Health 6*(1). https://doi.org/10.3389/fpubh.2018.00149

Bossey, A. (2019). Industry perceptions of potential digital futures for live performance in the staging and consumption of music festivals. In J. Mair (Ed.), *The Routledge handbook of festivals* (pp. 406–416). Routledge. https://doi.org/10.4324/9781315186320-41

Bossey, A. (2020). Accessibility all areas? UK live music industry perceptions of current practice and information and communication technology improvements to accessibility for music festival attendees who are Deaf or disabled. *International Journal of Event and Festival Management*, *11*(1), 6–25. https://doi.org/10.1108/ijefm-03-2019-0022

Bossey, A. (2022). Gatekeeper perceptions on adopting environmentally sound information and communication technology enhanced live performances to improve the sustainability of music festivals. *International Journal of Event and Festival Management*, *13*(3), 307–325. https://doi.org/10.1108/IJEFM-07-2021-0060

Bossey, A. (2023a). Piloting test scales to measure perceptions of "liveness" regarding ICT-enhanced performances at music festivals. *Event Management*, *27*(5), 1–28. https://doi.org/10.3727/152599523X16896548396798

Bossey, A. (2023b). Liveness 4.0: A new paradigm for accessibility at music festivals. In T. Brown & C. Drakeley (Eds.), *Virtual events management*. (pp. 126–137). Goodfellow Publishers.

Bossey, A. (2023c). *Live audience accessibility & augmentation ('LAAA')*. Falmouth University. https://www.falmouth.ac.uk/research/projects/laaa.

British Deaf News. (2020). *How do D/deaf people experience music*? https://www.britishdeafnews.co.uk/deaf-people-experience-music/

Brown, S. C., & Knox, D. (2017). Why go to pop concerts? The motivations behind live music attendance, *Musicae Scientiae, 21*(3), 233–249. https://doi.org/10.1177/1029864916650719

Bunge, M. A. (1977). *Treatise on basic philosophy volume 3*: *Ontology I—The furniture of the world*. Kluwer.

Calver, J., Dashper, K., Finkel, R., Fletcher, T., Lamond, I. R., May, E., Ormerod, N., Platt, L., & Sharp, B. (2023). The (in)visibility of equality, diversity, and inclusion research in events management journals. *Journal of Policy Research in Tourism, Leisure and Events*, *17*(2), 424–448. https://doi.org/10.1080/19407963.2023.2228820

Castle, C. L., Burland, K., & Greasley, A. (2022). Attending live music events with a visual impairment: Experiences, accessibility and recommendations for the future, *Arts and the Market, 12*(2), 164–179. https://doi.org/10.1108/AAM-04-2022-0015

Chen, Z., & Yu, T. (2024). Festivals and digitalisation: A critique of the literature. *Tourism Critiques, 6*(1) 2–17. https://doi.org/10.1108/TRC-05-2024-0022

Churchill, G. A. Jr. & Peter, J. P. (1984). Research design effects on the reliability of rating scales: A meta-analysis. *Journal of Marketing Research, 21*(4), 360–375. https://doi.org/10.1177/002224378402100402

Collins, K. (2013). *Playing with sound: A theory of interacting with sound and music in video games.* The MIT Press.

Connock, A. (2024). *Media management and live experience*. Routledge.

Couldry, N. (2004). Liveness, 'reality,' and the mediated habitus from television to the mobile phone. *The Communication Review*, *7*(4), 353–361. https://doi.org/10.1080/10714420490886952

Danielsen, A., & Kjus, Y. (2019). The mediated festival: Live music as trigger of streaming and social media engagement. *Convergence, 25*(4), 714–734. https://doi.org/10.1177/1354856517721808

Deaf Rave. (2024). About us. https://www.deafrave.com/#about-us

Disabled Solicitors Network. (2024). *A guide to disability terminology and language*. https://www.lawsociety.org.uk/topics/disabled-solicitors/a-guide-to-disability-terminology-and-language

Dixon, S., Malina, R. F., & Cubitt, S. (2015) *Digital performance: A history of new media in theatre, dance, performance art, and installation.* MIT Press.

Duignan, M. (2023). Thirty years of events-related research (1992–2022): Published works in Annals of Tourism Research and Annals of Tourism Research Empirical Insights. *Annals of Tourism Research, 100*(1), 103556. https://doi.org/10.1016/j.annals.2023.103556

Equality Act. (2010). The National Archives. https://www.legislation.gov.uk/ukpga/2010/15/contents

Exceptional Individuals. (2023). *Neurodiversity & neurodivergent: Meanings, types & examples*. https://exceptionalindividuals.com/neurodiversity/

Feigin, V. L., Vos, T., Nichols, E., Owolabi, M. O., Carroll, W. M., Dichgans, M., Deuschl, G., Parmar, P., Brainin, M., & Murray, C. (2020). The global burden of neurological disorders: Translating evidence into policy. *The Lancet Neurology, 19*(3), 255–265. https://doi.org/10.1016/S1474-4422(19)30411-9

Finkel, R., Sharp, B., & Sweeney, M. (2019). *Accessibility, inclusion, and diversity in critical event studies*. Routledge.

Fischer-Lichte, E. (2008). *The transformative power of performance: A new aesthetics* (S. I. Jain, Trans.). Routledge. https://doi.org/10.4324/9780203894989

Forbes, K. (2021). Dead Stars Live. In C. Anderton & S. Pisfil (Eds.), *Researching live music: Gigs, tours, concerts and festivals* (pp. 156–169). https://doi.org/10.4324/9780367405038-12

Foster-Cohen, S., & Mirfin-Veitch, B. (2017). Evidence for the effectiveness of visual supports in helping children with disabilities access the mainstream primary school curriculum. *Journal of Research in Special Educational Needs, 17*(1), 79–86. https://doi.org/10.1111/1471-3802.12105

Frenneaux, R., & Bennett, A. (2021). A new paradigm of engagement for the socially distanced artist. *Rock Music Studies, 8*(1), 65–75. https://doi.org/10.1080/19401159.2020.1852770

Gagen, J., & Cook, N. (2016). Performing live in Second Life. In S. Whiteley & S. Rambarran (Eds.), *The Oxford handbook of music and virtuality* (pp. 191–209). Oxford University Press.

Gehlbach, H., & Brinkworth, M. (2011). Measure twice, cut down error: A process for enhancing the validity of survey scales. *Review of General Psychology 15*(4), 380–387. https://doi.org/10.1037/a0025704

Getz, D. (2018). *Event evaluation—Theory and methods for event management & tourism*. Goodfellow Publishers.

Geus, S. D., Richards, G., & Toepoel, V. (2015). Conceptualisation and Operationalisation of Event and Festival Experiences: Creation of an Event Experience Scale. *Scandinavian Journal of Hospitality and Tourism, 16*(3), 274–296. https://doi.org/10.1080/15022250.2015.1101933

Girish, V., & Ching-Fu, C. (2017). Authenticity, experience, and loyalty in the festival context: Evidence from the San Fermin festival, Spain. *Current Issues in Tourism, 20*(15), 1551–1556. https://doi.org/10.1080/13683500.2017.1296821

Groarke, J. M., & Hogan, M. J. (2020). The Eudaimonic Functions of Music Listening Scale: An instrument to measure transcendence, flow and peak experience in music. *Frontiers in Psychology, 11*(1), 566296. https://doi.org/10.3389/fpsyg.2020.566296

Hearing Link Services. (2023). *What is a hearing loop*. https://www.hearinglink.org/technology/hearing-loops/what-is-a-hearing-loop/

Holt, F. (2016). New media, new festival worlds: Rethinking cultural events and televisuality through YouTube and the Tomorrowland Music Festival. In J. Deaville & C. Baade (Eds), *Music and the broadcast experience* (pp. 275–292). https://doi.org/10.1093/acprof:oso/9780199314706.003.0013

House of Commons Library. (2022). *UK disability statistics: Prevalence and life experiences*. https://commonslibrary.parliament.uk/research-briefings/cbp-9602/

Hwang, Y., & Shaomian, A. (2022). Life goes on: How BTS has turned virtual live concerts during the COVID-19 pandemic into showbiz dynamite. *Journal of the Music & Entertainment Industry Educators Association*, *22*(1), 77–110 https://doi.org/10.25101/22.3

Iannetta, G., Finch, A., & Baldock, K. (2023, December). *Making events work for everyone*. Spirit of 2012. https://spiritof2012.org.uk/wp-content/uploads/2023/12/23-12-15-Inclusion-report-for-online-publication.pdf

Jaimangal-Jones, D. (2017). Analysing the media discourses surrounding DJs as authentic performers and artists within electronic dance music culture magazines. *Leisure Studies*, *37*(2), 223–235. http://dx.doi.org/10.1080/02614367.2017.1339731

Jensen, M. T., Chambers, D., & Wilson, S. (2023). The future of deaf tourism studies: An interdisciplinary research agenda. *Annals of Tourism Research, 100*, 103549. https://doi.org/10.1016/j.annals.2023.103549

Kanga, Z. (2022). All my time: Experimental subversions of livestreamed performance during the Covid-19 pandemic. *Contemporary Music Review, 41*(4), 358–381. https://doi.org/10.1080/07494467.2022.2087445

Karki, K. (2021). Vocaloid liveness? Hatsune Miku and the live production of Japanese virtual idol concerts. In C. Anderton & S. Pisfil (Eds.), *Researching live music: Gigs, tours, concerts and festivals* (pp. 127–140). Focal Point. https://doi.org/10.4324/9780367405038-10

Keith, S., Hughes, D., Crowdy, D., Morrow, G., & Evans, M. (2014). Online and offline: Liveness in the Australian music industries. In V. Sarafian & R. Findlay (Eds.), *The state of the music industry* (pp. 221–241). Presses de I'Universite des sciences sociales de Toulouse.

Kim, S. (2017, March 29). Liveness: Performance of ideology and technology in the changing media environment. In *Oxford research encyclopaedia of literature*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190201098.013.76

Kleijnen, M., Lee, N., & Wetzels, M. (2009). An exploration of consumer resistance to innovation and its antecedents. *Journal of Economic Psychology*, *30*(1), 344–357. https://doi.org/10.1016/j.joep.2009.02.004

Kjus, Y., & Danielsen, A. (2016). Live mediation: Performing concerts using studio technology. *Popular Music, 35*(3), 320–337. http://www.jstor.org/stable/26358296

Konemann, L. (2024). Music, friendship, opportunity, freedom': The rise in clubs and gigs for neurodivergent people. *The Guardian*. https://www.theguardian.com/music/2024/oct/16/music-friendship-opportunity-freedom-the-rise-in-clubs-and-gigs-for-neurodivergent-people

Lazar, J., Goldstein, D., & Taylor, A. (2015). *Ensuring digital accessibility through process and policy*. Elsevier Science & Technology.

Long, P. (2016). Warts and all: Recording the live music experience. In K. Burland & S. Pitts (Eds.), *Coughing and clapping: Investigating audience experience* (pp. 147–158). Routledge.

Maaso, A. (2018). Music streaming, festivals and the eventisation of music. *Popular Music and Society*, *41*(2), 154–175. https://doi.org/10.1080/03007766.2016.1231001

Mahoney, K. (2023). *What is closed captioning*? 3Playmedia. https://www.3playmedia.com/blog/what-is-closed-captioning/#:~:text=Closed%20captioning%20is%20time%2Dsynchronized,caption%20frames%20with%20the%20video.

Matthews, J., & Nairn, A. (2023). Holographic ABBA: Examining fan responses to ABBA's virtual "live" concert. *Popular Music and Society*, *46*(3), 282–303. https://doi.org/10.1080/03007766.2023.2208048

Maxwell Keller, S. (2023). *Exploring liveness in early music*. Early Music America. https://www.earlymusicamerica.org/web-articles/exploring-liveness-in-early-music/

McKay, G. (2015). *The pop festival—History, music, media, culture*. Bloomsbury.

McLennan, H. (2023). *Here, there and everywhere 2023*. UK Music. https://www.ukmusic.org/research-reports/here-there-and-everywhere/

Meyer-Dinkgraäfe, D. (2015). Liveness: Phelan, Auslander and after. *Journal of Dramatic Theory and Criticism, 29*(2), 69–79. https://doi.org/10.1353/dtc.2015.0011

Michaud, A. (2022). Locating liveness in holographic performances: Technological anxiety and participatory fandom at Vocaloid concerts. *Popular Music. 41*(1), 10–19. https://doi.org/10.1017/S0261143021000660

Moelants, D., Demy, M., Grachten, M., Chia-Fen, W., & Leman, M. (2012). The influence of an audience on performers: A comparison between rehearsal and concert using audio, video and movement data. *Journal of New Music Research, 41*(1), 67–78. https://doi.org/10.1080/09298215.2011.642392

Muijs, D. (2011). *Doing quantitative research in education with SPSS*. SAGE Publications.

Mulder, M., & Hitters, E. (2021). Visiting pop concerts and festivals: Measuring the value of an integrated live music motivation scale. *Cultural Trends, 30*(4), 355–375. https://doi.org/10.1080/09548963.2021.1916738

Nabih, M., Bloem, J., & Poiesz, T. (1997). Conceptual issues in the study of innovation adoption behavior. *Advances in Consumer Research*, *24*(1) 190–196.

Nilsson, L. (2020). *Hybrid events: Breaking the borders*. Lab University of Applied Sciences Ltd.

Oltermann, P. (2024). 'The party is back': Rise in European music festivals banning smartphones. *The Guardian*. https://www.theguardian.com/music/article/2024/aug/17/the-party-is-back-rise-in-european-music-festivals-banning-smartphones

O'Neill, K., & Egermann, H. (2022). Development of the Social Experience of a Concert Scales (SECS): The social experience of a live Western Art Music Concert influences people's overall enjoyment of an event but not their emotional response to the music. *Music & Science, 5*(1), 1–22. https://doi.org/10.1177/20592043221106478

O'Neill, S., & Sloboda, J. (2017). Responding to performers: Listeners and audiences. In J. Rink, H. Gaunt, & A. Williamon (Eds.), *Musicians in the making: Pathways to creative performance* (pp. 322–340). Oxford Academic. https://doi.org/10.1093/acprof:oso/9780199346677.003.0023

Oxford Advanced Learners Dictionary. (2024). *Perception*. https://www.oxfordlearnersdictionaries.com/definition/english/perception

Oxford Learners Dictionary. (2024). *Authenticity*. https://www.oxfordlearnersdictionaries.com/definition/american_english/authenticity?q=authenticity#google_vignette

Phelan, P. (1993). *Unmarked: The politics of performance*. Routledge.

Phillips, M., & Krause, A. E. (2024). Audiences of the future—How can streamed music performance replicate the live music experience? In N. T. Smith, P. Peters, & K. Molina (Eds.), *Classical music futures practices of innovation*. Open Book Publishers. https://doi.org/10.11647/OBP.0353

Pun, K. (2016). *Dos and don'ts on designing for accessibility*. UK Government. https://accessibility.blog.gov.uk/2016/09/02/dos-and-donts-on-designing-for-accessibility/

Radbourne, J., Johansen, K., & Glow, H. (2016). The value of 'being there': How the live experience measures quality for the audience. In K. Burland & S. Pitts (Eds.), *Coughing and clapping: Investigating audience experience* (pp. 55–68). https://doi.org/10.4324/9781315574455

Richards, G. (2020). Measuring the dimensions of event experiences: Applying the Event Experience Scale to cultural events. *Journal of Policy Research in Tourism, Leisure & Events, 12*(3), 422–436. https://doi.org/10.1080/19407963.2019.1701800

Robertson, M., Yeoman, I., Smith, K., & McMahon-Beattie, U. (2015). Technology, society and visioning the future of music festivals. *Event Management, 19*(4) 567–587. https://doi.org/10.3727/152599515X14465748774001

Royal National Institute of Blind People. (2024). *Music*. https://www.rnib.org.uk/living-with-sight-loss/community-connection-and-wellbeing/leisure/music/

Rust, E. (2020). Understanding experiential value creation at small-scale events: A multi-stakeholder perspective. *Journal of Policy Research in Tourism, Leisure and Events, 12*(3), 344–362. http://doi.org/10.1080/19407963.2019.1701811

Sanden, P. (2013). *Liveness in modern music: Musicians, technology, and the perception of performance*. Routledge. https://doi.org/10.4324/9780203078518

Sanden, P. (2019). Rethinking liveness in the digital age. In N. Cook, M. M. Ingalls, & D. Trippett (Eds.), *The Cambridge companion to music in digital culture* (pp. 178–192). Cambridge University Press. https://doi.org/10.1017/9781316676639.017

Sandstrom, G. M., & Russo, F. A. (2013). Absorption in music: A scale to identify individuals with strong emotional responses to music. *Psychology of Music, 41*(2), 216–228. https://psycnet.apa.org/doi/10.1177/0305735611422508

Sengoz, A., Cavusoglu, M., Kement, U., & Bayar, S. B. (2024). Unveiling the symphony of experience: Exploring flow, inspiration, and revisit intentions among music festival attendees within the SOR model. *Journal of Retailing and Consumer Services, 81*(1) 1–12. https://doi.org/10.1016/j.jretconser.2024.104043.

Senn, O., Bechtold, T. A., Jerjen, R., Kilchenmann, L., & Hoesl, F. (2023). Three psychometric scales for groove research: Inner representation of temporal regularity, time-related interest, and energetic arousal. *Music & Science, 6*(1). https://doi.org/10.1177/20592043231185663

Shuker, R. (2022). *Popular music culture—The key concepts*. Routledge. https://doi.org/10.4324/9781003168751

Tamasauskas, A. (2023). *Report: Audio description on music concerts and videos*. RNIB. https://media.rnib.org.uk/documents/RNIB_report_on_the_need_for_audio_description_on_music_programmes_on_TV_2023.pdf

Tsangaris, M. (2020). The eternal course of live music: Views and experiences of an audience. In E. Mazierska, L. Gillon, & T. Rigg (Eds.), *The future of live music*. Bloomsbury Academic. https://doi.org/10.5040/9781501355905.0021

UNESCO Institute for Statistics. (2019). *Information and communication technologies (ICT)*. https://uis.unesco.org/en/glossary-term/information-and-communication-technologies-ict

Van Es, K. (2017). *The future of live*. Polity.

Vlachos, P. (2023). The future of the events industry. In T. Brown & C. Drakeley (Eds.), *Virtual events management* (pp. 126–137). Goodfellow Publishers.

Vodaphone. (2022). *Vodafone 5G gives deaf and hard-of-hearing fans a first-of-its-kind live music experience*. https://www.vodafone.co.uk/newscentre/news/5g-gives-deaf-festival-fans-a-first-of-its-kind-live-music-experience/

Waddell, G., & Williamon, A. (2022). Measuring the audience. In S. H. Lee (Ed.), *Scholarly research in music* (pp. 217–228). Routledge. https://doi.org/10.4324/9781003153924

Waite, S. (2019). Liveness and interactivity in popular music. In R. Hepworth-Sawyer, J. Hodgson, J. Paterson, & R. Toulson (Eds.), *Innovation in music performance, production, technology, and business* (pp. 114–130). Routledge.

Werner, P. D., Swope, A. J., & Heide, F. J. (2006). The music experience questionnaire: Development and correlates. *The Journal of Psychology, 140*(4), 329–345. https://doi.org/10.3200/JRLP.140.4.329-345

Weber, R. (2021). Constructs and indicators: An ontological analysis. *MIS Quarterly, 45*(4), 1644–1678. https://doi.org/10.25300/MISQ/2021/15999

Woojer. (2024). *Woojer Vest 3*. https://www.woojer.com/products/vest-3?srsltid=AfmBOoqh7VvXvVvZ3ohNn-OSiKFuDYcti8yONmDigMSqCBcIxhdb3wVQ

World Health Organization. (2025). *Deafness and hearing loss*. https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss

XRAI Glass. (2024). *Making live events accessible for all with UK Deaf Sport*. https://xrai.glass/blog/uk-deaf-sport/

Yang, K. (2023). Online concert audience experience and experiential value: Scale development and validation. *Oncology and Radiotherapy 17*(12), 877–890.

Youth Music. (2024). *Could this be the future of festivals? 5 changes we'd like to see for improved accessibility*. https://youthmusic.org.uk/could-be-future-festivals-5-changes-wed-see-improved-accessibility?utm_source=Youth+Music+Network+newsletter&utm_campaign=a0d45b5efc-Network_Newsletter_March_22_COPY_01&utm_medium=email&utm_term=0_4f7c978651-a0d45b5efc-316528305