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Assessing Accessibility within the Recording Industry for Engineers and Producers with Vision Loss

Lachi Music¹

¹ New York University, New York NY, USA

Correspondence should be addressed to Author (lachi@nyu.edu)

ABSTRACT

As recording technology shifts primarily to digital interfaces, these highly graphics-based solutions present potential access issues for the millions of Americans who identify as blind or low vision. This paper assessed the accessibility of recording technology for engineers and producers with vision loss in the U.S, and what potential roles financial and societal accessibility barriers play in the broader discussion of accessibility and career success. A mixed-methods approach was employed, including an online survey of 57 participants, with and without vision loss, as well as interviews with industry experts. Findings revealed that while users with vision loss had more difficulty navigating recording software, they navigated basic keyboard-shortcut tasks better than those without vision loss. Financial burdens, societal issues, and lack of practical opportunities were recognized as significant barriers to success for recording professionals with vision loss despite the accessibility of technology. This paper provides suggestions for improving the navigability of recording technology and the broader recording industry barriers, and proposes that future research take the extensive survey data collected to conduct further in depth and scientific analysis.

1 Introduction

As the world steers from physical to digital technology, highly visual-based software is becoming the standard, and blind and low vision engineers and producers may be missing out on this new frontier. There are 14 million Americans who identify as blind or low vision (BLV) in America today, which is expected to double by 2050 [1]. And while several recent studies have highlighted gender and racial inequities in the recording studio, there has been little systematic measurement of disability related inequities in the U.S.

The National Federation of the Blind posits that professionals with vision loss can equitably succeed with the proper tools and training, meaning not only must the technology be accessible, but that education and practical opportunity must be

affordable, available, and accessible [2]. This research study examined the difference in navigability of current technologies for recording professionals with and without vision loss, as well as assessed the role potential non-technology-related accessibility barriers, such as financial, educational and societal landscape, played in career sustainability for BLV recording professionals. This was achieved by conducting an online survey examining the accessibility of digital audio workstations (DAWs), social demographics, and individual views on industry navigation for 33 BLV and 24 non-BLV participants. The study also conducted verbal interviews with 12 reputable industry experts to assess the state of accessibility from leaders in fields intersecting music, technology and accessibility.

The purpose of this research is to present a deeper understanding on some of the complex issues

intersecting technology, accessibility and practical opportunity in the recording industry for recording professionals with vision loss. Through analyzing the data, areas of improvement can be identified to further expand access and opportunity to this active yet underserved population.

2 Literary Review

2.1 Navigating Available Recording Technology With Vision Loss

While there are some existing studies focused on the cross-section of accessibility and music, the few focused on recording technology are not US-centric, and fewer still directly address the role potential financial and societal barriers play; however, some do touch upon these issues indirectly.

For example, recent studies on the production practices of professionals with vision loss highlight the persistent need for sighted assistance faced by BLV engineers and producers and the reliance on custom-made tools from within the communities for support, which suggests challenges in accessing mainstream production resources and support [3, 4].

While several past recording technology studies utilized both surveys and interviews to assess the state of accessibility, none were based in the US. nor did they have a sizable number of participants with vision loss [5, 6].

2.2 Education, Training And Affordability

In 2016 and later in 2018, the Association for Computing Machinery's TACCESS published several papers discussing the concept of social accessibility—the idea that, beyond functionality, accessibility includes affordability and social appearance. The studies found that when design of form and function of an assistive device is poor, social inclusion is negatively affected, thus diminishing the perceived quality of the technology by those who interact with the user and the users themselves. It was also concluded that design for disability must include use of testers with and without disabilities to address functional and social factors simultaneously [7, 8]. Additionally, if one cannot afford the software, app, or device, it is by definition not accessible [9].

70% of blind people are unemployed, due less to lack in assistive technology and more to lack of training, transportation difficulties, and social stigmas [10]. Little can be found on career training and vocational programs for BLV recording professionals. Programs dedicated to those with vision loss, such as the Miami Light House's Better Chance Music Program or Chicago's I See Music School are rare and must partner with funding agencies to offer affordable rates [11].

3 Methodology

The aforementioned studies either were not US-centric or did not compare the experience between users with and without vision loss. To examine recording technology accessibility for US-based BLV and non-BLV individuals and the role of possible societal barriers, a mixed-methods approach was employed, consisting of verbal interviews with industry experts and an online survey of BLV and non-BLV participants.

The interviews aimed to gather insights from 12 industry experts regarding the navigability of recording technology, the social and non-technological accessibility barriers within the recording industry for BLV professionals, and the potential strategies for improvement. The online survey collected data from 33 users with and 24 users without vision loss on their social demographics, their experiences navigating recording technology, and their views on the social landscape of the recording industry for career success. All participants surveyed were US-based and over 18 years of age, with only 4 BLV and 1 non-BLV participants who were not regular DAW users.

Doing both expert interviews and a survey offered comprehensive evaluation from which to gather feedback and allowed for examination of whether expert opinion and the habits and practices of the surveyed population coincided.

4 Results and Discussion

4.1 Expert Interview Results

The experts interviewed consisted of engineers, producers, composers, production educators, an accessibility consultant, and a director of technology. Upon asking each of the 12 interviewed

experts a series of the same open-ended questions (including thoughts on the accessibility of recording technology and non-technological accessibility barriers for blind or low vision professionals), the experts generally agreed that while accessibility in recording technology and software has come a long way, it is not yet sufficient for BLV engineers and producers to equitably compete. Most conceded that they know less than ten BLV engineers or producers they would consider career-competitive.

Common issues cited were that only basic tasks and functionalities were navigable out-of-the-box for the majority of digital audio workstations, and that extra plug-ins and work-arounds, community-made add-ons, or advanced engineering knowledge were needed for more advanced functionality. Complex or multi-step tasks were cited to be the most difficult to achieve especially considering industry-standard project deadlines.

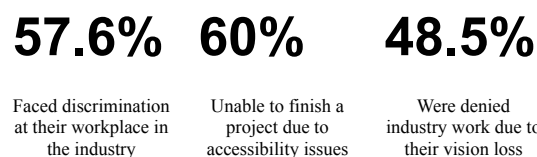
Experts expressed even less optimism regarding social accessibility within the industry landscape, with many believing the recording industry is not set up for BLV engineers and producers to thrive. Common explanations included hefty financial barriers—with recording technology, assistive technology gear, individualized training and education being very expensive to maintain—the lack of awareness of both industry leaders and audio technology establishments on BLV needs and accommodations, stigmas and societal discrimination, and limited networking and introductory practical career opportunities.

4.2 Survey Results

The online survey allowed us to compare views on recording technology access and the industry as a whole for both BLV and non-BLV survey participants, as well as how successful both groups of respondents believed they could become, considering their career goals based on the current technology and industry access for both groups.

4.2.1 Blindness And General Recording Industry Workplace Statistics

Those who identified as BLV were asked a series of questions regarding their experience navigating the recording industry, ranging from ability to complete a project to workplace discrimination. Some useful statistics came from these questions posed only to those 33.



As shown above, 60% stated they were unable to finish a project due to accessibility issues. 57.6% faced discrimination at their workplace in the industry due to their vision loss, and almost half (48.5%) were denied a job because of their vision loss. With 60% unable to complete a project due to inaccessibility, it is imperative to find out the particular access needs of BLV recording professionals to decrease that percentage. And with almost 50% feeling their vision loss has been a hindrance to getting hired, it is imperative to find what industry, societal, and social factors are at play.

Vision loss is a broad spectrum, and those who are totally blind may have different access needs than those who are partially blind. Of the 33 who identified as BLV, 19 responded as totally blind and 14 responded as partially blind. As such, some results are split up to highlight the partially blind experience.

4.2.2 General Technology Preferences

Participants answered questions concerning the basic day-to-day technology they use and how they interact with that technology, whether via screen reader, zoom text, keyboard, mouse, or other interfaces. Non-BLV users generally preferred the Mac OS with the mouse used as their primary method of navigation, while BLV users were split evenly between Mac and Windows/PC but almost unanimously preferred the keyboard as their primary navigation method—i.e using keyboard arrows to navigate menus, and keyboard shortcuts for quick basic tasks. Note, this is not about the usage in general, but the usage as primary.

4.2.3 Accessibility Of Recording Technology

When asked their preferred DAWs, most respondents in both the BLV and non-BLV groups answered Pro Tools and Logic; however, many BLV respondents also mentioned Reaper—a digital audio platform said to be fully accessible with screen readers. When asked how accessible their regularly used recording technology was via Likert-scale

rating, Figure 1 shows that non-BLV respondents on average found it generally accessible, while BLV respondents found it was less accessible than their non-BLV counterparts.

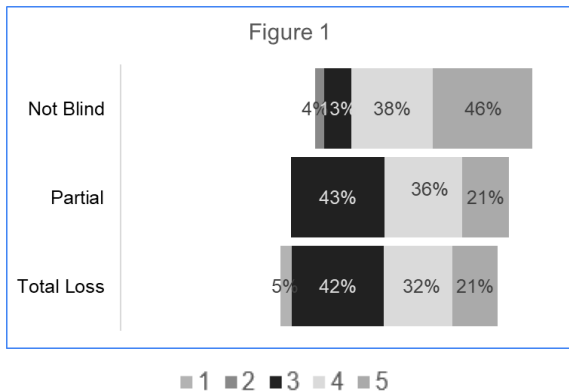


Figure 1 Response data: On a scale of 1 to 5 (5 being very accessible), how accessible for you is the current music and recording technology you use? n = 57. Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very accessible). Overall we see that respondents who are not blind found their technology much more accessible than the other two populations.

Participants were then asked an extensive series of Likert-scale questions regarding the ease of use doing certain relatively common tasks on their preferred DAW: i.e transport tasks, editing, mixing, organizing and other project-based tasks—all things an engineer or producer would need to know to successfully complete a project. 50 of the 57 respondents were qualified to participate in this series of questions. Some findings of note in the below figures:

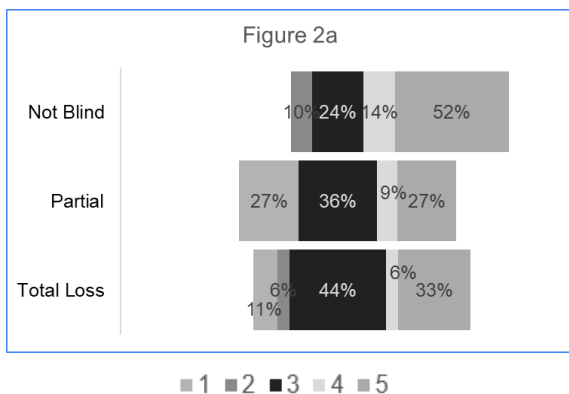


Figure 2a Response data: In terms of your overall project on DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Creating your own Presets and Templates? n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

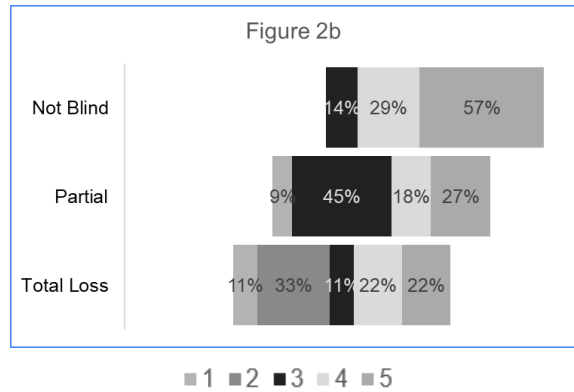


Figure 2b Response data: In terms of your overall project on DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Color-coding, adding markers and comments to tracks or track groups? n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

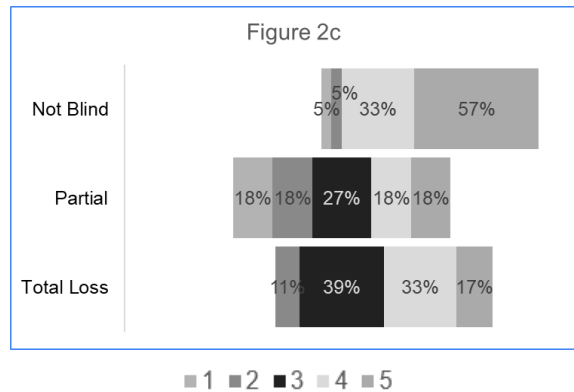


Figure 2c Response data: When editing and mixing with your DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Selecting, sliding and lining up tracks? n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

As depicted in Figure 2a, 2b and 2c BLV respondents found it more difficult to create presets and templates, to color-code tracks and add markers, and to select and line up tracks on average than the non-BLV respondents. These are combination or style-based tasks that require some vision, often result in a change in visual presentation not linked to audio information, and do not typically have simple keyboard shortcuts.

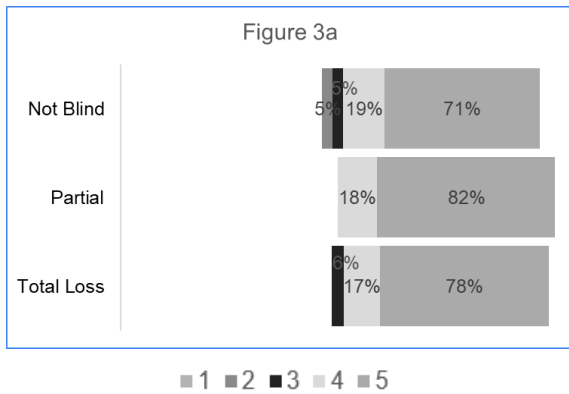


Figure 3a Response data: *When editing and mixing with your DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Muting, unmuting, soloing or setting volume?* n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

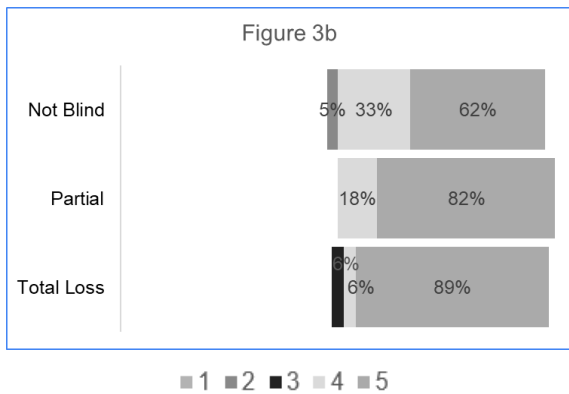


Figure 3b Response data: *When using your DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Record arming and recording on a track?* n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

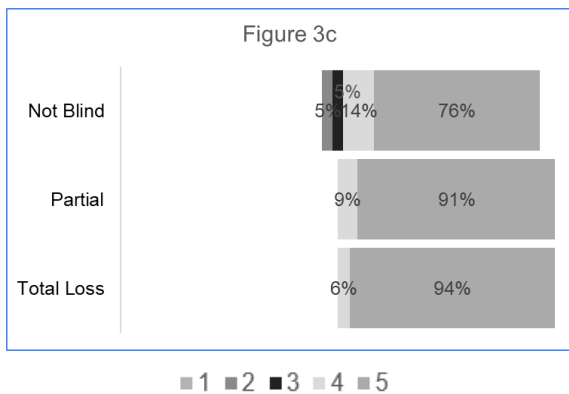


Figure 3c Response data: *When using your DAW, on a scale of 1 to 5 with 5 being Very Easy, how difficult do you find Playback start and stop?* n=50 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very easy).

However, when looking at more basic single-step tasks that do typically have simple keyboard shortcuts—like playback start/stop, record arming, muting and soloing—BLV respondents had an easier time navigating to complete these tasks on average than their non-BLV counterparts, as seen in Figures 3a, 3b and 3c. These tasks also typically provide immediate auditory feedback to determine if the task was completed correctly.

With over 60% of BLV respondents stating they could not finish a project due to accessibility issues, the number of completed projects between BLV and non-BLV respondents was compared. Figure 4 graphically depicts that the BLV participants have completed fewer projects, with almost two-thirds (18 of 29) completing only 10 projects or less.

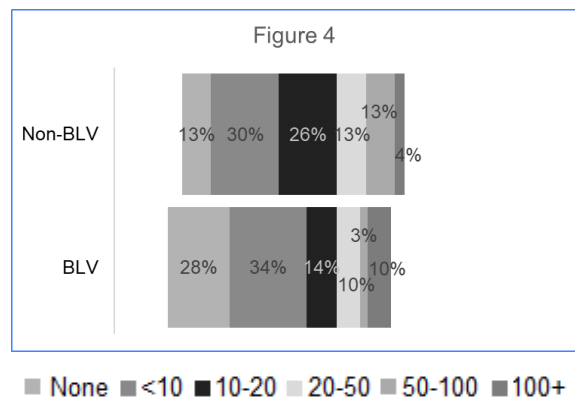


Figure 4 Response data: *How many projects, where you were the sole or lead producer/engineer, have you fully completed?* n=52 Divergent stacked bars, left to right: None, Under 10, 10 to 20, 20 to 50, 50 to 100, 100+

When looking at the accessibility of recording technology tools as a measure of success, participants were asked if they felt the current tools available were accessible enough for career sustainability. While most non-BLV participants found the tools accessible enough for success, BLV participants were split 60/40, as presented in Figure 5.

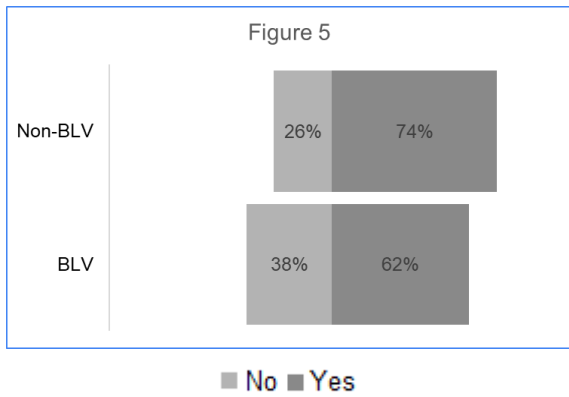


Figure 5 Response data: *Do you feel that the available tools for you are accessible enough for you to succeed in the music industry?* n=49 Divergent stacked bars, left to right No, Yes.

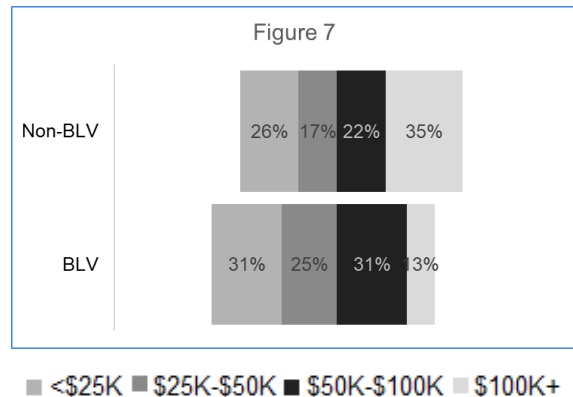


Figure 7 Response data: *Household Income?* n=55 Divergent stacked bars, left to right: \$0 - \$25K, \$25K - \$50K, \$50K - \$100K, \$100K+

4.2.4 Non-Technological Accessibility Barriers

Education And Income

In comparing education and income demographic statistics as shown in Figure 6 and Figure 7, results depict some sharp differences in the BLV vs. non-BLV populations. Non-BLV respondents predominated in Graduate degree or higher, and BLV respondents had higher numbers within Associate Degree and High school Diploma. BLV respondents were almost four times more likely (at 41%) to have an Associates or lower as their highest degree completed as compared to their non-BLV counterparts (at 9%). The Household Income graph shows a higher proportion within the non-BLV group earning \$100K+.

Percent Of Income From Music

Again 60% of BLV respondents stating inability to complete a project due to access issues, and almost 50% indicating denial of a job. When looking at the percent of respondents' income from music industry work, Figure 8 depicts that BLV recording professionals were nearly five times more likely (at 41%) to have made no income from music industry work as compared to their non-BLV counterparts (at 9%).

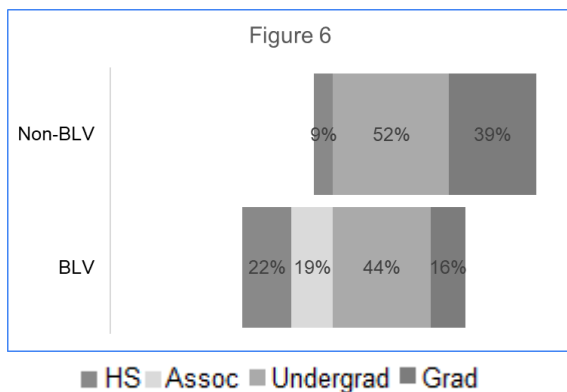


Figure 6 Response data: *General Education Completion Level?* n=55 Divergent stacked bars, left to right: High School Diploma, Associates Degree, Undergraduate Degree, Graduate/Post-Graduate Degree

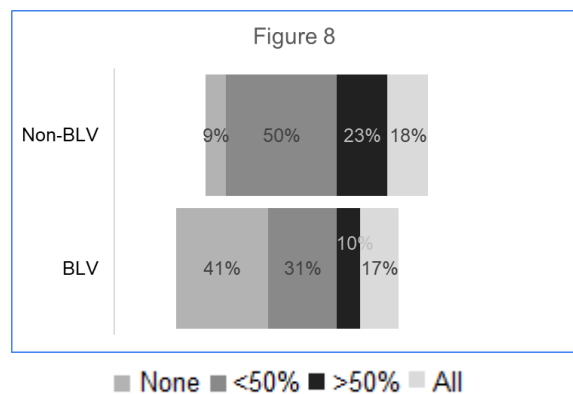


Figure 8 Response data: *What percent of your income is Music Industry related?* n=51 Divergent stacked bars, left to right: None, Less than 50%, More than 50%, All

Equipment Costs

As Figure 9 shows, BLV respondents reported a similar if not slightly higher cost for equipment due to the greater expense for added assistive technologies and accessible plug-ins.

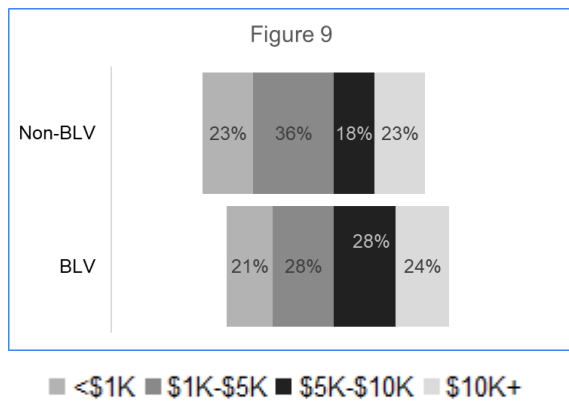


Figure 9 Response data: *What’s the total cost of the equipment and software in your studio?* n=51 Divergent stacked bars, left to right: Under \$1000, \$1,000 - \$5,000, \$5,000 - \$10,000, \$10,000+

4.2.5 Can One Achieve Goals In The Current Recording Industry?

The survey closed with the question, “How accessible is the current Music and Recording Industry as a whole, in order for you to achieve your goals?” As shown in Figure 10, BLV participants indicated the music industry was more inaccessible than the non-BLV. When comparing these averages against the responses to how accessible recording technology was, as shown in Figure 1, both BLV and non-BLV respondents had more faith in technology access than they did in social accessibility.

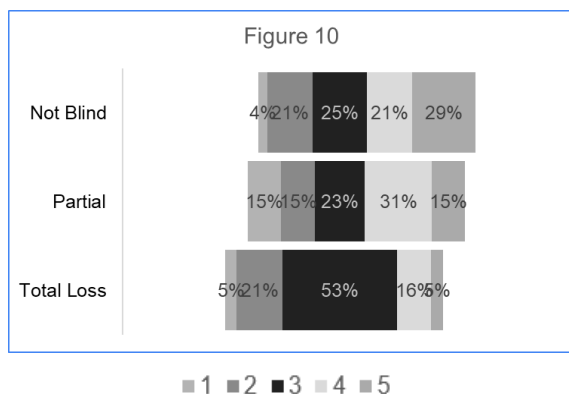


Figure 10 Response data: *On a scale of 1 to 5 (5 being very accessible), how accessible for you is the current music and recording Industry as a whole, in order for you to achieve your goals?* n=56 Divergent stacked bars, left to right: 1, 2, 3, 4, 5 (very accessible). Overall we see that respondents who are BLV found the industry as a whole less accessible.

5 Limitations

One limitation of this study is the potential bias in the sample of non-BLV participants, as many of them were recruited from the Recording Academy or the NYU Music Technology program, which may skew the results towards higher levels of education and income. It is also reasonable to assume that all of those participants were non-BLV.

Another study limitation is the inability to estimate the full population of recording professionals with vision loss, which makes it difficult to determine if the sample size is adequate for generalizability of the findings. Additionally, the online survey and interview questions were generated simultaneously, which may have missed opportunities for more fine-tuned comparative insight. Pairing the online survey with before and after interview discussions could have provided valuable insights examining how expert views may have changed based on the survey results.

6 Future Work

While this study collected data to analyze social and cultural relationships, future research can use the data collected in the online survey to test a myriad of hypotheses. Additionally, the sample population was limited to US-based respondents to begin building US statistics pertaining to disability and the music industry. Many professionals from the UK and Europe expressed interest in the study. This study’s data can serve as the US arm to an identical or similar study performed in a different country.

Finally, the expert interviews collected, along with the current trends therein, serves as a baseline in time. Future interviews pertaining to questions or themes of similar nature can use these interviews for comparison. Overall, while this research has identified limitations, it also provides a foundation for future research in this area and suggests potential avenues for further exploration and analysis.

7 Conclusions

In analyzing both the interviews and the survey results, some assumed truths regarding accessibility in the recording industry for professionals with vision loss have been validated, while some new conversations have come to surface.

One interesting observation was that BLV participants had an easier time navigating basic single-step tasks in their DAWs using keyboard

shortcuts as compared to non-BLV respondents. This suggests that incorporating keyboard shortcuts into basic tasks universally could improve ease of use for all users, regardless of visual acuity. The accessible design of new products could uncover more universally beneficial navigation. Interviewees suggested that the development of more accessible software and hardware by audio technologists must be in consultation with blind technology users, audio professionals, or designers.

While there was optimism about the accessibility of recording technology, there were concerns about the associated financial, educational, and societal barriers facing recording professionals with vision loss. Financial burden was identified as a major barrier, with BLV recording professionals generally having lower household incomes but spending more on technology and equipment due to the added expense of adaptive tools and customizations. Societal navigation was also challenging. Interviewees noted that greater visibility of successful BLV recording professionals would help promote social acceptance, and that the industry must be more intentional in offering resources, networking, and career opportunities to BLV recording professionals.

In conclusion, while there has been some progress in improving the accessibility of recording technology for engineers and producers with vision loss, there are still challenges to overcome, and accompanying financial, educational, and social barriers play a major role in career sustainability. Further efforts are needed to promote universal design, increase affordable training solutions, and equitable career practices. Addressing these issues will contribute to a more inclusive and accessible recording industry for all professionals, regardless of visual acuity.

8 Acknowledgements

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References

- [1] Varma, R., Vajaranant, TS., Burkemper, B., et al. (2016) Visual Impairment and Blindness in Adults in the United States: Demographic and Geographic Variations From 2015 to 2050. JAMA Ophthalmol. <https://jamanetwork.com/journals/jamaophth/almology/fullarticle/2523780>
- [2] Cunningham, K. (2017). #HOWWESEEIT. American Action Fund for Blind Children and Adults. <https://nfb.org/sites/default/files/images/nfb/publications/fr/fr36/4/fr360403.htm>
- [3] Payne, W., et al. (2020, October). How Blind and Visually Impaired Composers, Producers, and Songwriters Leverage and Adapt Music Technology. ASSETS '20: Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility, 36,1-13. <https://dl.acm.org/doi/abs/10.1145/3373625.3417002>
- [4] Abir, S., & Piper, A. (2020, October). Understanding audio production practices of people with vision impairments. ASSETS '20: Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility, 36,1-13. <https://doi.org/10.1145/3373625.3416993>
- [5] Pedrini, G., Ludovico, L. & Presti, G. (2020). Evaluating the Accessibility of Digital Audio Workstations for Blind or Visually Impaired People. Proceedings of the 4th International Conference on Computer-Human Interaction Research and Applications (CHIRA 2020), pages 225-232
- [6] Pešek, J. (2021, March). Accessibility of Music Production Software for the Visually Impaired. Art of Sound, Royal Conservatoire The Hague
- [7] Shinohara, K. & Wobbrock, J. (2016). Self-Conscious or Self-Confident? A Diary Study Conceptualizing the Social Accessibility of Assistive Technology. ACM Trans. Access. Comput. 8, 2, Article 5 (January 2016), 31 pages. <https://doi.org/10.1145/2827857>
- [8] Shinohara, K., Bennett, C., Pratt, W., & Wobbrock, J. (2018). Tenets for Social Accessibility: Towards Humanizing Disabled People in Design. ACM Trans. Access. Comput. 11, 1, Article 6 (March 2018), 31 pages. <https://doi.org/10.1145/3178855>

- [9] Soyer, H. (2022, July). The High Cost of Disability: The Inaccessibility of the Cost of Access. *World Institute on Disability*. <https://wid.org/the-high-cost-of-disability-the-inaccessibility-of-the-cost-of-access/>
- [10] Rogers, L. (2021, June). Employment Barriers for the Blind & Visually Impaired. World Services for the Blind. <https://www.wsblind.org/blog/2021/6/16/employment-barriers-for-the-blind-and-visually-impaired>
- [11] Jacko, V. A., Cobo, H., Cobo, A., Fleming, R., & Moore, J. E. (2010). Mainstream Employment in Music Production for Individuals who are Visually Impaired: Development of a Model Training Program. *Journal of Visual Impairment & Blindness*, 104(9), 519–522. <https://doi.org/10.1177/0145482X101040090>

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