Beyond Audacity:
Supporting Sonic Futures through the Digital Audio Workstation

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Introduction

In a popular TED talk, Treasure (2014) reflects on problems with the way that we use the human voice: "We speak not very well, to people who simply aren't listening, in an environment that's all about noise and bad acoustics." A truly beautiful world, he muses, would be one in which we would create and consume sound with attention and "in environments that were designed consciously for sound." Whether or not one agrees with his pessimism about everyday speaking, communication centers can be one of the spaces where human sound is produced and listened to with the kind of idealized attention that Treasure imagines. With that kind of listening in mind, I reflect particularly on the technologies available today and going into the future that can and should be of use for producing and listening to sound in communication centers.

I see two potential pitfalls in discussing sound technologies in this context. The first is promoting technological determinism that relies too heavily on technology to shape practice or that may insist that certain practices will only be possible with particular kinds of specialized technology. The second potential pitfall is wrongly assuming that everything about the latest technology that communication centers may need is completely new.

My argument that communication centers and multiliteracy centers embrace more professional Digital Audio Workstation (DAW) software could be critiqued for suggesting that centers acquire software and hardware that could be expensive (though I will recommend some inexpensive options). I confess that I have spent hours over the last decade, pouring over online forum arguments about the best microphones, preamps, and DAWs. Recording equipment can come at a significant cost, with some microphones costing thousands of dollars. Obsession with recording gear features in a sketch from comedy series *Portlandia*, where a would-be recording artist with a head of curly red hair (Fred Armisen), invests in all the right equipment for a recording studio (Armisen, 2012). In a quick sequence of cuts, he gives his taciturn friend Lance the grand tour, repeatedly touting equipment that was used on the Beach Boys *Pet Sounds* and "a lot of Beatles type stuff" and showing off his specially-designed echo chamber. Armisen's deadpan delivery pokes fun at recording engineers and hobby home recorders alike. "I've got all the top-quality stuff, I just need the top-quality people," he declares. As he and Lance sip a beer on the porch he says, "All I need is for someone to come in and book time, and if they don't, I'm out a lot of cash." Part of the target of this particular parody is the nostalgia for vintage gear as the engineer in the sketch attempts to recreate what some have seen as the dying industry of the high-end recording studio where top quality gear brought artists who would pay a premium. Truly, obsessing over the perfect gear is probably not necessary for communication centers, but being able to record sound of a fairly high quality with minimal background noise should be a

priority and can be done at much cheaper prices than it could even a decade ago. For this reason, it makes sense to embrace digital technologies that can move beyond limited audio editors that have largely been embraced only because they are free. The moment has come to increase the amount of familiarity with recording software, beginning with our centers and employees.

It has become common to blame the democratization of the DAW for the demise of many of the great recording studios. Why pay high prices by the hour when you could tinker on your own, coming remarkably close to professional sounds with minimal gear in the privacy of your own basement? Despite the potential validity of this argument, debates over whether old techniques or new are better should also recognize that nostalgia for old analog gear and the enthusiasm for new digital gear are both celebrations of technology. While not everything about the digital technologies and current sound hardware available to us is completely new, it is true that a proliferation of software and hardware has been made available to support a prosumer market of home recording equipment. The ubiquity of equipment and software makes this an apt moment for communication centers to embrace these technologies. But rather than act as though the advent of digital recording technologies represents some completely new moment in sound recording as it applies to communication centers, I will first examine the ways in which new microphones and recording processes were discussed in the field of communication by analyzing articles in the *Quarterly Journal of Speech.* I will then provide a brief survey of available DAW software and discuss my own experience teaching students to use it.

Microphones and Recording Technology in the *Quarterly Journal of Speech*

It may seem counterintuitive to look to the past to think about what tools will be useful in the future for communication centers, but sonic technologies have long been of interest in communication. As early as the 1920s, articles in the *Quarterly Journal of Speech* (hereafter *QJS*) began to focus on the technical components necessary to record speech as a means of improving verbal communication, to prepare students for careers in film and broadcasting, and to record speeches and performances. An overview of some of these articles will provide a backdrop to enrich suggestions about sonic futures.

From the first article in the journal mentioning the recording of speech the pedagogical aim for recording was often overtly normative. Watkins (1924) details the way that the "apparatus for recording speeches" would serve as an "absolute check upon bad grammar, bad sentence structure, bad paragraph structure, and other rhetorical imperfections"(p. 253). Its secondary purpose was to show the student "his manner of speaking" and to highlight other problems with speech like "bad or wrong vowel qualities...indistinct or wrong utterance of consonants" as well as problems with pitch, speed or other tics, such as the excessive clearing of the throat (Watkins, 1924, p. 253). In addition to this normative goal, the article describes the use of a complex apparatus that involved a battery-powered microphone connected to an amplifier, in turn connected to loudspeakers (or telemegaphones). The apparatus also required a "dictaphone" (the genericized term for a dictation machine) in order to record and play back, as well as an operator who could make "auxiliary adjustments" in sound level of the signal for recording (Watkins, 1924, p. 254). The report details

difficulties that were met and overcome, including the "blasting" of the record when the sound levels were too loud and the need to boost the volume to "produce good records for women's voices" so they could be "built up in strength" (Watkins, 1924, p. 255).

The normative function of sound recording is discussed just a few years later with regard to talking films. Immel (1929) writes about the future role that speech and recording will play in the new "talking pictures." He discusses various Technologies used to connect sound to pictures and the limitations of previous recording technology, including its inability to reproduce the higher frequencies of speech satisfactorily. Because "everybody" will hear the new talkies and will likely imitate the speech contained therein, "teachers of speech have a profound reason for interesting themselves in this new art. It will do more to set the fashion in language than all the teachers of the country. It will mold and shape our speech as no other influence could possibly do (Immel, 1929, p. 164). Immel (1929) sees the speech teacher's role as regulating or adding commentary upon the quality of speech against the base of demands of the hoi polloi: "Producers give the public what they think the public wants. Now if poor speech is the rule and we say nothing about it, and if, at the same time the box-office receipts say that the people like the play, there will be no incentive for the producer to give us anything better" (p. 165). In his view, this new focus on speech recording technology associated with the "talkies" should allow teachers of speech to "enter upon a very effective campaign for better speech" (Immel, 1929, p. 165).

Taking a bit of turn toward the people, Lawton (1930) discusses the increasing availability of radio technology, then a decade old (p. 257) and warns of the problem of trying to be too "high brow" on the radio in an attempt to educate rather than being primarily concerned with "what the audience wants" (p. 260). In other words, with the increasing distribution of sound, concern shifts from trying to correct everyone's speech to trying to get people to tune in. Accordingly, he discusses various surveys that have attempted to find what the public is most interested in hearing and ways one can hold attention as well as the difficulty of getting a laugh over the radio, especially given the "subdued, formal, almost depressing atmosphere of the broadcasting studio" where one has to be careful "walking about...tapping the toe to music, moving a chair, crackling a paper [etc.]," where they must "take every precaution against extraneous noises of all kinds" (Lawton, 1930, p. 267). This attention to sound quality continues to be an important consideration today as we design spaces for students to use equipment. As a comic example, he cites a letter to a studio in Los Angeles from a listener in Cuba who complained of the sound of a leaky water tap in the studio (Lawton, 1930, p. 267). Despite the democratic tone, however, the pedagogical aim still looks to regulate student and later professional verbal practices, criticizing pedantic diction, careless pronunciation, and even the pronouncing of America as "AmURica" (Lawton, 1930, p. 272).

The reported experience with recording equipment in *QJS* gets more technologically advanced over the years, progressing from the rudimentary apparatuses of the 20s and early 30s. Williamson (1935) reports on two years of experience with recording equipment in his program at New York University. He describes the Speech Department's upgrading of their recording equipment from older dictation on wax cylinders to aluminum disc recording. The article details

the costs of various parts of the signal chain as well as materials to treat the room. This article also discusses the way that the use of the technology expands beyond the original reason for purchasing. While the motivation for purchasing the equipment remains "primarily for phonetic recordings of students with dialects and speech defects," the department "discovered shortly… that it had other varied possibilities of usefulness" such as recording student speeches, instruction in radio broadcasting, and voice recording for foreign language department students (Williamson, 1935, p. 203). Like the other articles, this one also mentions difficulties students had recording speeches in a live setting, including unwanted noise when using a lapel mic (Williamson, 1935, p. 204), a remedy for which involved using an Amplion carbon microphone designed for military use, strapped to the chest. Williamson is clear that the complex task of recording, in which up to six speeches are recorded in an hour, involves the assistance of an operator attuned to the best recording levels and familiar with the technology who also "must take time to gain the confidence of the student, must break down barriers, and rehearse to get the right volume and rate" (198). In these technical aspects, the trained operator plays an important role. When Lawton, Phillips, Ewbank, & Judson (1937) write about equipment for the radio speaking course, they too discuss the need for an operator. Kettering (1947) gives pointers for personnel working with sound recording equipment, arguing for a hands-on approach: "There is a certain 'know-how' in recording that can come only with practice and experience" (p. 213). For these operators, he gives advice about room acoustics (sound treatment is recommended), setting levels (set volume based on the loudest part of the performance or the loudest voice), and microphone placement for various types of recording (including musical instruments and performers).

Figure 1. *Amplion Carbon Microphone from the 1930s*

The discussion in *QJS* gets more technical as the technologies advance over the years. Discussing recording equipment used for broadcasting classes, Lawton, Phillips, Ewbank, & Judson (1937) outline the equipment that is needed, with additional radio simulation rooms available for those programs that don't have a radio station at their disposal. The ideal equipment available in professional spaces at the time could record and play back signals between 30hz and 10khz.[1] The article details different types of microphones on the market: crystal, ribbon, dynamic, condenser, and carbon. When Windesheim (1938) writes about the evolution of speech recording machines, he points to recording improvements that allow

[1] The best equipment today follows the spectrum of human hearing from 20hz to 20khz, but numerous devices still deviate from that frequency range and adults past their early twenties can only hear up to 17khz.

a greater frequency range to be captured, noting that the dictating machine still serves the purpose of "checking up on articulatory defects and common errors in speaking, and is used by many teachers of speech for recording students' speeches" (p. 259). He reviews the evolution of various recording technologies and speculates that photographic recording could become simple and affordable enough to be used in "speech work" (Windesheim, 1938, p. 265). Leaving room for "the possibility of the discovery of some wholly new principle" in sound recording, he expresses his hope that future development will make use of magnetic recording methods that promise more widespread availability (Windesheim, 1938, p. 265).

In a final trio of articles on the topic, Kettering (1944) reflects on the difficulties present in trying to use inferior technology to do sound recording and suggests that even the best teachers are limited by inferior quality technology. Kettering believes that sound recording will play an important role in education and that after the war, technology with increased fidelity will hit the market. Kettering's main point (1944) seems to be that companies will continue to manufacture lesser quality products unless consumers demand otherwise. Pronovost (1944) discusses more broadly the impact of electronic technologies on speech, believing that various technologies developed in connection with the war would impact the field of speech, from walkie-talkies to improvements in television. Like Kettering, Pronovost suggests that higher fidelity equipment will become available as the market demands it and that speech teachers should play a role in "promoting a desire for high-fidelity reproduction so that high-fidelity sets can be produced in sufficient quantities to be sold for a profit at a lower cost" (Pronovost, 1944, p. 267) By 1952, magnetic tape recording had gotten significantly more affordable and was mentioned in the Equipment section of *QJS* advertising "an admirably clear booklet for the non-technical reader on *Fundamentals of Magnetic Recording*" as well as a "completely portable" magnetic tape recorder called Magnemite coming in at just under 10 lbs and costing under $200 (Temple, 1952, p. 111).

This review of articles in *QJS* shows that over quite a long span of time interest in sound recording technologies played a role in shaping conceptions of speech instruction. These articles also show that scholars were trying to break new ground and that they frequently faced difficulties and limitations with the hardware they were adopting. Initially, scholars seemed to embrace the new recording technologies largely as tools for normalizing and regulating speech (whether of the masses or of the students). Though some communication centers may use the technology in these ways, in my view, this is problematic. In an older version of the center that I direct at Michigan Technological University, students with perceived speech and grammar defects were separated into an "auto-tutorial lab" where they would engage in remediation lessons with tape players and headphones "free from the distraction of human interaction" before they could engage with tutors (Grimm, 2009, p. 12). This isn't a model that I would be anxious to return to because it uses sound technology in ways that dehumanize the users. But if not to normalize and regulate speech, then what? Perhaps, beginning with our tutors, the goal could focus more on expertise with sound technologies. This emphasis, rather than making students adept at using technology to self-regulate, recording technologies could create more powerful self-expression and more attentive listening to the human voice and other sounds. The operator role discussed in several articles points to an individual who

aids in using recording equipment to its full capacity and with a minimum of error. In other words, the role of the operator (like the role of the tutor) is to be an expert listener who has developed sufficient know-how to be of service to users.

Equipment

Beyond Audacity. I have reviewed discussions by scholars of speech and communications of microphonic and recording technologies as they attempted to make use of emergent technologies. In the spirit of these earlier articles often focused on practice, I will spend the remainder of this article discussing some of the technical equipment and software available today as well as some difficulties I've observed novice operators have with these technologies. The digital audio workstation, once specialized pieces of hardware taking advantage of rudimentary computing power, by the mid-90s brought multitrack recording to the personal computer with software called Deck that could be used by anyone with a Macintosh computer. The DAW became much more accessible to consumers in the 00s, making audio editing much more rapid and advanced than the days of cutting and splicing of physical tape (a process that is often remembered by skeuomorphic scissors in DAW software). In addition, with the advent of audio plugins, it is now possible to manipulate sound within the computer using effects plugins that two decades ago would have required outboard gear costing a fortune. Many plugins simulate outboard gear while others offer effects that would have been unimaginable. For a while, some DAW software required expensive, specialized hardware, but most DAW software is now hardware-agnostic though a recording interface (usually connecting via USB) is still required for the best analog to digital conversion.

It's worth mentioning more specifically just why editing in a DAW opens up so many possibilities. Part of what led me to write this article was my own surprise at how frequently I hear people recommending the open-source software Audacity for audio recording and editing in an educational setting. One thing that makes current DAWs so useful for understanding and manipulating audio is that it is capable of non-destructive editing which allows the user to manipulate the audio track, cutting, splicing, and adding whatever effects may be desired—all while leaving the original audio files intact. This allows the user to hear the effects of a plugin in real-time as they test different settings or presets and even drag and drop a track's plugin chain to hear how effects change when processed in different sequences. Rendering or bouncing a stereo mix creates a new file, leaving the original audio intact. Not all audio editors are capable of this feature. While Audacity, an open-source audio editor, has enjoyed widespread use in academic circles largely because it was free, it does not provide the non-destructive editing that makes a digital audio workstation so liberating. As a sound editor, it relies on destructive editing that alters and degrades the original sound file from the moment it is opened in the program. While effects can be undone, they must be rendered as the audio is altered each time an effect is applied. For simple recording and rudimentary editing, it may suffice, but in order to fully experiment with the tools available for sound recording and editing, communication centers and classrooms should move beyond Audacity to the DAW. I first started recording music using Audacity in the 2000s but switched to an inexpensive DAW called Cakewalk in 2002, and, in comparison to audacity, I found the new DAW aptly named.

Choosing DAW Software. When it comes to choosing a DAW in 2017-18, there are many on the market with different options at various price points. Even some of those I mention in this brief survey may be discontinued or replaced within a short time. Many blogs post lists of the best DAWs each year, like the one published on Music Radar's website (The MusicRadar team, 2017). The choice of what software to use among the different DAWs available depends on budget and software platform. There are low-cost options available and some free options as well. Some free versions may have limitations—like limiting the number of tracks one can mix together or the number of plugins that can be applied—with additional features only unlocked by paying for the pro version. Below is a list of some DAWs that would be worth trying as of the time of this writing.

Cross Platform.

Pro Tools. For a long time, the industry-standard for recording technology has been Pro Tools, a piece of software that once required proprietary, expensive hardware to run. Because of the exclusivity and cost, other competitors crept in over the years, and the list continues to grow. Avid, the maker of Pro Tools, has reacted by creating their own free version; it's a useable piece of software, and the price is right. It has some limitations, like not allowing as many tracks as the Pro Tools | HD version (but it also doesn't cost $2,500 for a license!)

Adobe Audition is an obvious choice if you are on an Adobe campus or already have subscriptions to the Adobe Creative Suite (of which it is a part). This license comes at an annual cost, which may be a deterrent. (N.B.: Audition has both a destructive wave-editor mode and a non-destructive multitrack mode).

Reaper is my personal favorite for its low cost and lightweight package—it's available as uncrippled shareware you can download with a click, so you can thoroughly try it out before you buy a license. It is lightweight, so it works well on older computers, and it can even be run as a portable app off of a USB drive. Though Reaper is bundled with most of the necessary plugins, it does not come with a full suite of them like some programs do, but that's also why its download file is so small. Reaper is appealing for those who like tinkering because it is extensively customizable and has a very active community of users who support it and share their customizations and add-ons. Reaper is easy to try, since it can be quickly downloaded and run without any limitations, but it's possible that you may find something simpler more appealing. If you find the software useful, you can pay a reasonable price for a license (currently $60).

Apple only. *GarageBand*. If your center uses Apple computers, an obvious starting point is GarageBand because it is available for free. Though simplified, it includes many of the features present in most DAWs and even makes some of them easier. The fact that it is free makes it certainly worth checking out on your Mac or IOS device. Apple's more professional digital audio workstation is called Logic Pro X, the price of which was lowered a few years ago from $499 to $199. It includes a full library of effects plugins, synths, and samples, which provides an easy upgrade path to a professional DAW should needs become more complex.

Cloud based. A relatively recent phenomenon are DAWs that run in the cloud and allow for easy collaboration. A hybrid version is Ohm Studio, which uses the cloud

but requires a downloaded app. Dropin bills itself as "the first real Cloud Audio Workstation." And Soundtrap, which is the most user-friendly in my tests, allows for easy collaboration and lets you record from your computer directly into the web browser. A nice feature is the ability to invite someone else to contribute directly into the same project.

Other contenders. Numerous other developers have released DAWs. Here are a few that work across Mac and Windows: Studio One by Presonus (it has a lite version for free called Studio One Prime that you must create an account to download), Cubase (a paid software with three different levels of cost depending on features). Tracktion has a practice of releasing their second-to-last version for free to entice users to upgrade to the latest version. I'm also omitting here some well-known DAWs that tend to be used more for electronic midi music production (FL Studio, Ableton Live), since most communication centers probably won't focus on making beats.

Plugins. Even if the chosen DAW doesn't come with many plugins, thousands of free Virtual Studio Technology (VST) plugins are available from sites like KVR Audio. Some free DAWs put restrictions on the number of plugins you can load, and programs on a Mac, like GarageBand and Logic, use a different format called Audio Units (AU). However, most of the products listed above already provide the basic plugins that you will want to become familiar with initially if recording speech: compressor, limiter, reverb, equalization, noise reduction, and some kind of spectral analysis. Spectral analysis can be particularly useful for changing the way we think of audio because these plugins allow you to visualize the frequencies of sound contained in your recording. This visualization can help to visually detect noise or to analyze lower-frequency sounds not reproduced by inexpensive speakers.

Hardware

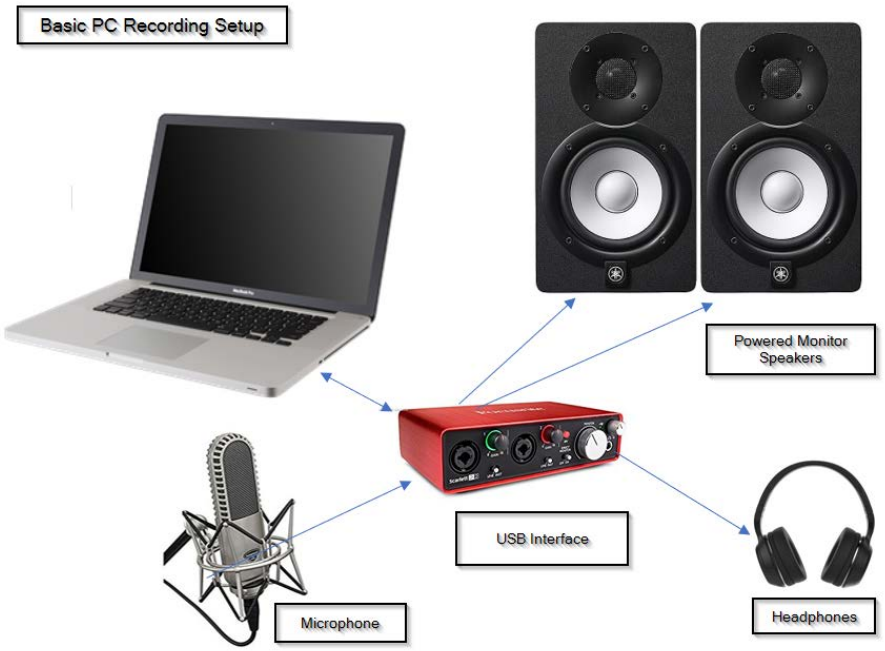

Figure 2. *Illustration of basic computer recording setup using a USB interface.*

Audio can be recorded using the built-in sound card, but most built-in sound cards introduce unwanted noise to the recording. Instead, a piece of hardware called a recording interface is recommended, along with a microphone. A USB microphone combines these two pieces of hardware into one but limits the choice of input to one particular microphone and some USB mics do not include control of input volume and use lower-quality analog-to-digital converters than an interface. For podcasting, the Blue Yeti microphone is currently a well-reviewed USB mic. For an inexpensive but good quality Sound Card/interface, at the moment, the second generation Focusrite 2i2 is a good-quality option if there is no need to record more than two microphones at once. The ubiquity of decent, entry-level microphones became a reality in the early 2000s, with most of the microphones being made overseas as copies of more expensive German microphones. Acceptable starter microphones are available from Audio Technica, Rode, Blue, CAD, MXL, and others. [2]

Audile Technique for Tutor/Operators

Some recording tasks being done in communication centers could be improved with the technology I have been discussing: such activities include recording speeches, presentations, or podcasts. High fidelity sound and better editing capabilities will lead to a better product. At the same time, I am suggesting something further: Embracing DAW technology allows communication centers to become spaces where tutors and students listen with more attention and effect a change in our orientation to sound. If more people learned to handle a DAW to record and manipulate sound in the same way that the word processor has truly been democratized, our listening techniques would arguably change. Even though the DAW has led to some democratization in the music industry, the software has yet to achieve such universal adoption. Since most students still will not come to centers with this expertise, tutoring staff become like the expert operators mentioned in the old *QJS* articles. In arguing for this expertise, I am thinking of Jonathan Sterne's concept of audile technique or, put another way, "techniques of listening," which he traces through various sound technologies (Sterne, 2014, p. 57). Sterne's work argues against the general notion that modern culture has abandoned the aural in favor of the visual; he traces the development of specialized sound technologies used to listen to phenomena: the doctor with a stethoscope; the telegrapher rapidly taking down a message; and, more broadly, the person at the telephone, phonograph, or radio (Sterne, 2003). By emphasizing the DAW, I'm calling for a further development of audile technique that focuses on both listening and production.

But this knowledge is not gained effortlessly. In our center, we recently decided to build hands-on work with audio

[2] Debates about high-quality microphones vs cheap copies rage in online forums, with numerous instructions on how to modify the mics made in Asia to improve their sound. One publication warned of the lack of innovation from companies that are good at copying but not at doing research and development (Morvlyth, 2004). A word of caution: in the last couple of years, there has been a trend toward very low-cost microphones being sold on Amazon.com and Ebay.com that look like quality large-diaphragm condenser microphones but internally are small, electret condenser microphones. With a good preamp, these microphones will sound passable, but they won't rival the quality of a large diaphragm condenser. Readers are advised to check a microphone database like recordinghacks.com for more detailed information before buying.

into the weekly training for our coaches. Our coaches' prior experience with recording ranged from fairly extensive to none at all. Over the course of a few weeks, we asked coaches to join with a partner and record interviews with each each other about learning experiences they had during tutorials. They were then asked to edit and mix those files in a DAW (we allowed them to choose between Audition and Logic, since we had access to both in our Humanities Digital Media Zone). They were asked to edit the interview down to three minutes and add music or other sound effects where appropriate. Because some students had no prior experience, we approached the assignment with that assumption; however, given the range of student skill, we allowed them to tinker and then ask for help when they got stuck. In a few cases, mistakes in the recording process made them have to start their interviews over again. As the assistant director of our center observed, most of the mistakes could have been avoided with more direct assistance during the recording setup, something we plan to do for the next round of training.

The following list is a compilation of points where different students ran into problems or needed help and could serve as a starting point for anyone else wishing to train their employees in recording:

- Creating a track to record in.
- Arming a Track to record (usually just a button in the software, but this requires clicking the software on the track and making sure the desired input is selected if recording using a USB mic or a recording interface directly to the computer).
- Importing audio files (if adding music tracks or loading a file recorded using a handheld recording device. The feature is usually listed under "import," and many programs will allow you to drag and drop files directly into the interface).
- Matching levels (This beguiled some who had, for example, shared a microphone but had been sitting at different distances from the mic during recording. The best practice is to make sure that levels are checked and that the same distance is maintained. Ideally, two different microphones would be used to keep audio from different speakers on seperate tracks).
- Gain staging (getting the right amount of volume on the incoming track at the most effective points of the audio chain--usually with the correct gain setting at the microphone preamp stage-- and setting the levels properly. This proved to be our most frequent problem and is the point where more painstakingly assisting our employees with setup would have helped. Still, the difference between a track recorded at a suitable volume and one that had too low of a level was dramatic enough that trying to fix the problem was a useful part of the training).
- Making sound waves visible when a track was recorded at too low of a volume (Where the level could be salvaged through compressing and boosting the track, in some cases, we still needed to visually amplify the waveform so that it could be seen for editing. With levels set appropriately, this should not be a problem).
- Editing a track (splicing, deleting, moving, and crossfading pieces of the audio).
- Adding fx plugins or plug-in chains (including reverb, EQ, compressors, and de-essers).

- Rendering/bouncing an audio file to share or listen on another device (students need to learn that in a DAW, one can save a project, but in order to share the output of the product, it must be bounced down to a stereo mix which can be a WAV file or some other compressed format like an MP3).

Conclusion

Different centers may have different uses for sound technologies depending on their missions and institutional mandates. In my own context, directing a multiliteracies center, one motivation to engage with sound technologies is an emphasis in our Composition Program on multimodal communication, or contexts in which the various communication modes are not completed in isolation. However, even within that body of scholarship in writing studies, there have been calls to focus particularly on the importance of sound (Selfe, 2009) and acknowledgement that multimodal assignments have often fallen short by simply seeing different modes of communication as another venue to propagate the genre of the essay, rather than exploring the "specific invention, delivery, and rhetorical possibilities" of non-textual modes (Alexander & Rhodes, 2014, p. 3). From a tutorial perspective, such productions cannot simply be approached with the same "read-aloud" methods used to respond to student writing (McKinney, 2009), and additional expertise is required. By engaging with sound in more advanced ways, communication centers can play a key role in supporting familiarity with sound technology across the curriculum.

The DAW has evolved to become a tool that allows users not only to better record and manipulate sound but also to better visualize and understand it. Ultimately, using the DAW calls for a different kind of attention to sound that will allow us to do something that communication centers have long been about: being better listeners. The technological developments of the past have led to the mass-production of high-quality sound equipment that can continue to play a role in instruction in speech, communication, and multimodal assignments. As seen in the review of early literature on the topic, sound technology was often viewed as a tool for exposing and eradicating speech errors. Today, however, the democratization of sound with the DAW can allow for the continued preservation of the uniqueness of our voices.

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