

DESN 384 Digital Sound Week 4

Suggested Order of Activities

Download the manual for your audio interface, and familiarize yourself with:

- how to engage phantom power - unless you have microphone with built-in USB;
- and how to set the gain.

If you have a Windows operating system, and depending on the particular model of interface, you may need to install a driver.

Listen to the lecture on Recording Process Flow, while **viewing** the associated slides, and answering the study questions below.

Watch the lecture on Digitizing Sound and A/D and D/A Converters, while answering the study questions below.

Listen to the lecture 1 on Microphones, while **viewing** the associated slides, and answering the study questions below.

View the short slide set Microphone Placement, and answering the study questions below.

Listen to the Demonstration and Lecture for First Recording with Audacity and answering the study questions below.

Background On-Line Reading: follow "web resource links" on drbraukmann.com, examine and be prepared to answer the study questions listed under each link on the web resource links page.

M1. Microphones 101

M2. What is Frequency Response?

M3. What is Transient Response?

RC1. Introduction to Home Recording

RC4. How to Prevent Distortion

Listen to the short Room Reflection Examples, and set up your recording space appropriately. **Then...**

Complete Assignments 1 & 2 using either Audacity or Audition

On drbraukmann.com you will find:

Links to appropriate instrumental pads.

Assignment 1: Get your recording system up and running on your own computer. Create a recording of you reading a paragraph about where you grew up. It is always recommended to practice first. 20 seconds is enough.

Your voice in the recording should:

- sound natural, warm, not thin nor boom-y,

- include no pops, thumps, mechanical sounds,
- include no first reflections. Have the space set up to minimize reflections, even put a blanket over your desktop.

- include no, or minimal, natural room reverb,
- we should be able to hear *sibilance* (sound of "T" and "S") but not so much as to "stand out" unnaturally.

Edit it to make it consistent in loudness, and eliminate unnecessarily long pauses. 20 seconds is enough. Submit an MP3

*Please check: Computers default to using their built-in mic. Be sure that you are recording from the large diameter condenser and interface, and **not** via the built-in mic.*

Assignment 2: Record and produce a professional 1 to 2-minute interview with a friend or teacher or fellow student. (It starts with an instrumental musical pad See ** below) Ask their name, where they came from, how they got to EWU, what their job or major field of study is, why they chose that field, and what their plans are, etc.

Your grade is in the details...

- This is to be a *polished production*. So write a script of the questions before you begin. Practice asking the questions, and make a trial recording of yourself asking them.

- If a particular question or response is not delivered smoothly, or if an unwelcome noise such as a chair squeak happens, simply re-record the same question and/or answer again right away. You don't have to stop the machine and start over. Just edit out the flawed section later in your DAW, such as Audacity or Audition.

- Since you most likely have only have one microphone, *you will need to do editing to make it into a polished production*. To do this, record the interview with the *interviewee using the microphone* appropriately close up, and your voice in the background. Then, re-record your questions with good mic technique (close up) and edit the questions back into the interview with your DAW. *Don't try to record from across a table to the mic because you will pick up too much of the first reflections.*

- Your voice and the interviewee's voice should sound natural, full and warm, and include all the characteristics of assignment 1.
- You need to experiment with the location of microphone, the distance and angle between the mic and lips, and the gain settings, to get the best results. Room reflections will lose you points. Kitchens are usually the worst place, bedrooms often are better, closets better yet. Put a blanket or towel under the microphone stand to fully cover the surface and eliminate reflections and vibrations from the table top. Staying close to the microphone also helps eliminate room sounds.
- Edit the recording as necessary, so it will be consistent in loudness, not to have oddly long pauses. And normalize the levels so the meters in the software are getting up to about -6 to -3dB on only the loudest passages.

OK "getting up to -6dB" may sound backwards, but in your DAW, 0 dB on the meters = 100% level. Any level MORE THAN THAT might result in an over-driven or distorted recording. Any level LESS THAN THAT is marked as -dB. Normalization refers to making the level match standard levels, or match the levels of other files in the project. More often than not, this means increasing the level a bit (In Audacity, you can use Effect > Amplify)

- • Finally, *add* a five-second *instrumental* music introduction, (on a separate track) called a *pad*, that sets a professional tone, and fades out as you begin to introduce your guest. You will find an assortment of appropriate music at drbraukmann.com under *Music Examples* > *Music Background Pads*. Be conservative with the music. Mix the tracks together and export as a stereo MP3.

Study Questions:

Process: Signal Flow in a Recording System

What does each of these do?

- A preamp
- An analog-to-Digital converter
- An audio Interface
- A gain control
- An aux control
- A pan control (panorama)
- A mute button
- A solo button
- A fader control

How should you use a clipping indicator light when setting up to record?

What advantage does a mixer have over an audio interface box? (2 advantages?)

Does an audio interface with a microphone input and a usb connection always have a preamplifier?

Questions: Recording with Audacity

What happens when a signal (or recording) level is "too hot"?

How can you "see" if the level is too hot?

What causes clipping distortion and how do you avoid it? (Also see Avoiding Distortion – Media College, *and* sound3.swf)

What do you have to do to get a laptop (or desktop) computer to record with an audio interface?

What does *clipping* distortion look like in a waveform?

What does clipping distortion *sound* like?

If you hear clipping distortion in your recording, what are *several things you can do* to record again without getting that clipping?

What is phantom power? When should you unplug a phantom-powered microphone?

When should you set the sampling rate to 48000?

Questions: Digitizing Sound and A/D D/A

What does analog mean?

Why can't computers store analog sound? (Reel to reel tape decks can.)

What is the difference in file size between a mono and a stereo sound file?

Why would an acoustic instrument, like a guitar or a clarinet, benefit from being recorded in stereo rather than mono?

Why, when creating a track for a mix, is a voice generally *not* recorded in stereo?

When might it make sense for you use a sample rate less than 44.1K, such as 22K?

What sample rate is common for voice and music?

What sample rate is required for film sound?

24-bit sound files are much larger than 16-bit files.
Why do we prefer 24-bit resolution when we record?
(Two reasons)

Questions: Microphones

Among the different types of microphones...

Which are more rugged?

(Small condenser, large condenser, dynamic, ribbon)

Which have better *detail* (extended freq. response)?
Another way to ask this question, is which type of microphone generally has the *least* high-frequency roll-off?

(Small condenser, large condenser, dynamic, ribbon)

Which type of microphone generally has the *least* high-frequency roll-off?

Which are *warm* sounding?

(Small condenser, large condenser, dynamic, ribbon)

Note: The concept of "warm" shows up in sound all the time. It generally refers to a little more energy in the 100-250 Hz region, or to less energy in the 1000 to 10K Hz region. It can also refer to more even harmonics in a sound, such as those harmonics naturally created by vacuum tube amplifiers. This would be the fundamental frequency x2, x4, x8 and so on. Transistor amplifiers sometimes emphasize odd harmonics, such as x3, x5 etc, and can sound edgy or harsh rather than warm.

So, what is meant by a *warm* sound?

Which microphone types need power?

(Small condenser, large condenser, dynamic, ribbon)

What do shotgun mics not do well?

Pros and cons of a lavalier mic?

When is a boundary mic the best choice?

Know about typical microphone pickup patterns, including omni-directional, cardioid, and figure-8.
For instance: which reject sound from the side?

Which sounds best from the side?

Which picks up from the back?

Why do we care very much about the frequency response from the rear, of a mic that is directional and is designed to pick up from the front?

Moving closer to a cardioid or figure-8 mic will make it sound warmer or more bass-filled. (This is called a proximity effect) But what can happen if you move too close?

What happens if you move too far away?

What would you change if you heard too much sibilance in your recording?

What would you change if you heard too much plosives in your recording?

Is a pop filter required for a condenser mic?

Why would you want a mic with a flat frequency response?

When would you pick one with a non-linear frequency response?

Questions: Microphone Placement

How can you tell where is the front of a LDC mic?

Will you usually need a pad switched on a mic?

Should you use a low filter switched on a mic?

When recording, why do you have to keep in mind the direct path of the sound, as well as the path of early reflections, and reverberation?

How do you decide how close a microphone should be to the talent?

What are a three ways to reduce plosive pops?

When recording voice, what are the four specific recommendations for mic placement, as listed in the Shure Home Recording pdf?

Questions: Digital Sound Files

Explain just how sampling works.

What advantages does a higher sampling rate offer?

What two advantages does a higher bit depth offer?

Are there advantages to a lower sampling rate?

What are the two most common sampling rates, and which one is for film production?

Other Questions:

What does normalization mean?

What is the difference between *peak* and *RMS* recording level meters?

What is a musical *pad*?