CHAPTER 4 SOUND ELEMENTS

Multimedia Communications by Marie Rutherford

Please visit the web version of Multimedia Communications (https://ecampusontario.pressbooks.pub/multimediacomm/) to access the complete book, interactive activities and ancillary resources.

Learning Outcomes

- Explain sound waves and how sound works
- Explore the common elements of effective sound and sound bites
- Describe podcasting outlining the various formats and steps to create a podcast
- Practice and apply
- Key Terms and References

Sound and Multimedia Content

Sound when included in a presentation typically enhances the overall experience by adding depth, emotion, and context. Sound includes various forms such as voice, music, and sound effects. Multimedia projects often use different types of audio, which may involve interview clips, voice-overs, natural sound, and **ambient** sound. Ambient sound is associated with sound tones that are interpreted as being peaceful and calm. Consider ways sounds enhances the uses experience and how it may create memorable experiences. From a practical perspective sound is used for storytelling and the guiding the audience's attention. **Audio r**elates to the electrical frequency or electrical energy (analog or digital signals) that represent sound electrically

Sound is a type of energy that travels through the air or other mediums as vibrations or waves.

Here are some common audio formats:

1. **MP3 (.mp3)**: A popular compressed audio format that balances quality and file size.
2. **WAV (.wav)**: An uncompressed format that offers high-quality audio but results in larger file sizes.
3. **M4A (.m4a)**: An audio-only version of the MP4 format, often used for high-quality audio.
4. **WMA(.wma):** An audio format developed by Microsoft to deploy in Windows environments

This chapter will explore sound as an important multimedia element.

Chapter Organization and Preview

- Sounds Waves and Microphones
- Types of Audio Files
- Sound Bites and Quotables
- Podcasting
- Explore, Practice and Apply
- Key Chapter Terms

Attribution & References

4.1 SOUND WAVES AND MICROPHONES

Overview of Sound Waves

Before we can start learning about audio production and microphones, let's get a general idea of how sound waves work. Though the study of sound waves is mostly a **technical** matter, understanding the science behind it can help us manage it. How an audio producer adjusts the settings on microphones **(method)** can affect how sound waves enter the device. And ultimately, how those soundwave frequencies are manipulated within a mix can dramatically change the emotional response a piece of audio has on a listener **(creative approach)**.

Graphical representation of a sound wave showing peaks and valleys of sound as the audio progresses along a horizontal line. **Source:** Image by KMpumlwana, CC0/ Public Domain

Consider

1. What types of sounds make you feel relaxed?
2. What types of sounds make you feel stressed or anxious?

How Sound Works

Sound is the term to describe what is heard when sound waves pass through a medium to the ear. All sounds

are made by vibrations of molecules through which the sound travels. For instance, when a drum or a cymbal is struck, the object vibrates. These vibrations make air molecules move. Sound waves move away from their sound source (where they came from) traveling on the air molecules. When the vibrating air molecules reach our ears, the eardrum vibrates, too. The bones of the ear vibrate in the same way that of the object that started the sound wave.

These vibrations let you hear different sounds. Even music is vibrations. Irregular vibrations are noise. People can make very complex sounds. We use them for speech.

Sound waves are longitudinal waves with two parts: *compression* and *rarefaction*. Compression is the part of the sound waves where the molecules of air are pushed (*compressed*) together. Rarefaction is the part of the waves where the molecules are far away from each other. Sound waves are a sequence of compression and rarefaction.

Learn More about Sound Waves, decibels, and digital audio

Use the controls at the bottom of the interactive presentation to review 4 short videos on sound, or access the text links below.

Learn More about Sound Waves, decibels, and digital audio (text version)
Watch the following videos on YouTube to learn more.

- What is Sound? (https://www.youtube.com/watch?v=hfzCLClVO8g)
- How Sound Works (https://www.youtube.com/watch?v=QBYz82nS_xk)
- How Digital Audio Works (https://www.youtube.com/watch?v=1RIA9U5oXro)
- Decibels (dB) Explained (https://www.youtube.com/watch?v=F4r3WI-JXlc)

Microphones

Learn more about Microphones

Use the controls at the bottom of the interactive presentation to review 4 short videos on microphones or access the text links below.

Learn more about microphones (text version)
Watch the following videos on YouTube to learn more.

- How Does a Microphone Work (https://fod.infobase.com/p_ViewVideo.aspx?xtid=168415&loid=539767&tScript=0#)
- A Quick Guide to Microphones (https://www.youtube.com/watch?v=PE6Qn4ZiEyo&t=76s)
- 4 Types of Microphones (https://www.youtube.com/watch?v=b-LtSElPnHg)
- Microphone Characteristics (https://www.youtube.com/watch?v=ecPUTGDX5cw)

Source: H5P presentation created for *Multimedia Communications*, CC BY-NC 4.0 except where otherwise noted.

A microphone lays on a table. **Source:** Photo by Pixabay, CC0

A microphone is a form of transducer. That means it converts a sound wave into an electronic signal carried by wire. Generally, when that electric signal is sent through an amplified speaker, it is then converted back into a sound wave. Microphones may also use a processor to convert the sound wave into signal (or code) that can be used by a computer. Understanding the ***technical*** aspects of microphones is so very important for producing good audio. It also ensures electrical safety to you and your equipment. As you gain more experience with microphones, where you place them in relation to what is being recorded (method) will become equally important. Experimenting with both of those aspects will help you develop your own signature sounds using your favorite microphones and microphone placements ***(creative approach)***.

For many of us who started out with analog recording, microphones were the gateway into audio production. But whether you use analog or digital audio equipment, the right microphone pointed in the proper direction can help a performance stand out. There are dozens of styles of microphones and a wide variety of prices. To begin however, let's concentrate on the two most common types of microphones: Dynamic and Condenser.

Dynamic Microphone – In a dynamic microphone, a thin diaphragm is connected to a coil of wire, called a voice coil, which is precisely suspended over a powerful magnet.

- As the sound waves strike the diaphragm, it causes it to vibrate moving the voice coil through the magnetic field generated by the magnet generating a small bit of electricity which is sent down the output leads.
- This is the **electromagnetic principle**.
- ADVANTAGE: They are simply constructed and can handle loud sources without much distortion.
- DISADVANTAGE: They are weak when trying to capture soft distant sources because the diaphragm requires a lot of sound energy to move.
- DISADVANTAGE: Dynamic microphones have a heavy diaphragm along with additional weight from the coil of wire.
    - It therefore takes longer for the diaphragm to react to a sound wave causing a less accurate recording.

Condenser Microphone – Condensers use two charged plates; one fixed and one which can move acting like a diaphragm.

- There's no coil.
- The two charged electric plates create what's called a capacitor. As sound waves strike the electrically charged diaphragm, it moves in relation to the fixed plate changing its capacitance and generating a very small electric charge which is amplified inside the microphone.
- This is the **electrostatic principle**.
- ADVANTAGE: Because you're not moving a coil, condensers are more responsive in the high frequencies.
- ADVANTAGE: Because of the lack of magnets, condenser microphones can be very small.
- Because condensers work with electrically charged plates, they require some sort of outside power.
- Some microphones have the option of an onboard battery while all condensers can utilize something called Phantom Power.

Phantom Power – +48v of energy sent down the microphone cable to a condenser microphone from the audio recording or mixing board.

- This power enables the electrically charged diaphragm to move in response to sound waves.

Directional Response – Directional response is represented by something called a polar pattern.

Polar Pattern – Polar pattern is how well the microphone "hears" sound from different directions.

"On Axis" and "Off Axis" – On axis is directly in front of the sound source. Off axis is not directly in front of the sound source.

Omnidirectional Mics – This mic polar pattern is responsive to sound from all directions, you don't have to be "on axis" to be picked up.

- Lavalier and lapel mics are small condenser microphones with an omnidirectional pickup pattern that can be placed on a person.
- Boundary mics are omnidirectional condenser mics. They are positioned flush with a surface that capture sound as it rolls off the flat surface. Boundary mics are used in stage production and conference tables.
- ADVANTAGE: These mics are useful for picking up sound in a general area.
- ADVANTAGE: Lavalier / lapel mics are small and can be placed just about anywhere.
- ADVANTAGE: Boundary mics do not draw attention to themselves because they lay flat on the floor or wall.
- DISADVANTAGE: They will pick up all the unwanted sound in the area.
- DISADVANTAGE: Lavalier, lapel, and boundary mics won't have the same richness of sound as a shotgun or studio condenser mic.

Directional Mics: Cardioid Pattern – Most basic pattern.

- Heart-shaped pick up pattern.
- ADVANTAGE: Picks up what's in front but not behind.
- ADVANTAGE: It is suited for a live performance as it picks up the sound on axis but won't pick up what's behind it, like crowd noise or feedback from a speaker.

Directional Mics: Hypercardioid and Supercardioid Patterns – More directional than cardioid.

- Skinnier heart-shaped pick up pattern.
- Picks up the front and sides and rejects 150 degrees to the rear.
- Shotgun mics are supercardioid.
- ADVANTAGE: Great for recording location audio while trying to filter out some of the unwanted ambient sound.
- DISADVANTAGE: Can exhibit strange phasing sound effects when used in small spaces.

Directional Mics: Figure 8 Pickup Pattern / Bi-directional – The polar pattern looks like a figure 8.

- ADVANTAGE: Useful for certain musical applications or interviews with a person on each side of the mic.

Frequency Response of Mics

Learn more about frequency response of mics

Use the controls at the bottom of the interactive presentation to review 4 short videos on microphones or access the text links below.

Learn more about frequency response of mics (text version)
Watch the following videos on YouTube to learn more.

- Understanding Frequency Response (https://www.youtube.com/watch?v=7TH82dx7Qas)
- What is Frequency Response (https://www.youtube.com/watch?v=y4NqSGGRRJM)
- Microphone Response (https://www.youtube.com/watch?v=RT7ilQjQLj4)
- Polar Patterns Demonstrated (https://www.youtube.com/watch?v=N0X7owMBlCY)
- How Does Polar Pattern Work (https://www.youtube.com/watch?v=5ZEm1EvxL-E)

Most microphones come with a manual. If not, you can find one online by searching the brand and model number of the mic. These manuals can be very helpful in three areas. First, it will show you on a chart the polar pattern of the mic. Second, it may show you what certain switches will do that are located on the microphone and what is considered the front and back of it. Third, it will feature the Frequency Response. This chart will show a line (or lines) going from 20hz all the way up to 20khz. What to pay attention to is

Read more about Audio Frequency Spectrum from Teach Me Audio.

where this line is flattest on the chart. That area (range) is where the microphone most accurately picks up sound on the frequency spectrum. If it flattens out in low end areas of the spectrum, you can imagine that mic is best for bass sounds. If it is flat within the range of human vocals (approx. 100 to 120hz), then you can assume that particular microphone will work great on vocals. These are good places to start in your audio production development, but keep in mind that experimenting with different mics in various ways is the best way to discover what is the best mic to use for a given circumstance. If it sounds good, you're probably doing it right! Below is a link that explains the frequency spectrum in detail.

Attribution

4.2 TYPES OF AUDIO FILES

Introduction

An apparatus that uses binary code such as a computer or an iPhone manages sound in a digital format. There are many different types of playback devices and various ways these files are stored. Additionally, analog sound systems are still used to play and archive sound. An audio engineer can quickly discover there exists a vast expanse of recording formats that are not easily compatible or accessible. Understanding how the older systems work can help with most modern versions. And vice-versa. Take time to play and listen to music on a wide range of equipment from different eras. Learn how to convert one to the other and your expertise in the production field will certainly grow.

People that work in audio production need to know the differences between varying digital and analog files, how to convert one to another, and what each is best used for (**technical**). How we save our files, and how we transmit these files, and why we do so could be considered the **method** in our three pillar approach. The order in which we present these audio files or perhaps the final decision on where to share these files would fall under our **creative approach**.

For example, in the past, I've been hired to convert a client's old 78 vinyl record collection into digital files that could be played and organized on a typical home laptop computer. That required choosing the right equipment and cables to play records at the right speed and turning that analog signal into a digital one. Once transferred to my computer, I could then make some equalization adjustments and bring the overall volume up (or down) to a presentable level. Finally, I had to convert those large files into smaller MP3 files that I could electronically send back to the client.

In addition to the audio, I scanned the liner notes and artwork and included those attachments along with with MP3s. Once again, I used my **technical** knowledge to identify what equipment would be needed, I used different **methods** and orders of operation to make quality conversions, and I topped it off with some **creative approach** in packaging the final product so that it was an artistically unique experience for my client.

Read more about:

- Timeline of Audio Formats

Digital Audio File Formats

There are two major groups of audio file formats:

- Those using lossless compression, e.g. like WAV, FLAC
- Those using lossy compression, e.g. MP3, Ogg Vorbis, WMA, AAC

In the lossless compression of a piece of data, nothing is lost during the compression and the original data is restored upon uncompressing. In lossy compression, some data is lost during compression and upon uncompressing the data is not identical to the original but possibly close to it. Lossy compression is used mainly in the compression of multimedia data like audio or video where the loss of some details is tolerable under certain conditions, e.g., the human eye is unable to discern the loss in certain details of an image or video.

(https://en.wikipedia.org/wiki/Timeline_of_audio_formats)

- Format Guide to Sound Recordings [PDF] (https://www.archives.gov/files/preservation/formats/pdf/format-guide-to-sound-recordings.pdf)

WAV

WAVE form audio format (WAV) is a Microsoft and IBM audio file format for storing audio on PCs. It is the main format used on Microsoft Windows systems for raw audio storage. The WAV format is most commonly used with an uncompressed, lossless storage method (pulse-code modulation) resulting in comparatively large audio files. Today, the WAV audio format is no longer popular being superseded by other more efficient means of audio storage.

FLAC

Free Lossless Audio Codec (FLAC) is a popular lossless audio format with compression designed specifically for audio data streams, achieving compression rates of 30–50 percent. The format specification is publicly available and forms part of the FLAC Open Source project. It is supported by a growing list of audio software and devices.

MP3

MPEG-1 audio layer 3 (MP3) is a popular lossy compression audio format. The MP3 specification was set by the Motion Pictures Experts Group (MPEG), a working group of ISO/IEC charged with the development of video and audio encoding standards. The compression scheme and format for MP3 forms part of the MPEG-1 video and audio compression standard specifications and is an ISO standard, ISO/IEC 11172-3.

MP3 is one of the most popular audio file formats in use today. Music files encoded with MP3 are particularly popular on music exchange and download sites on the Internet due, in part, to the relatively small size of such files and the wide availability of free software on PCs that allow easy creation, sharing, collecting and playing of MP3 files.

WMA

Windows Media Audio (WMA) is a lossy compression audio file format developed by Microsoft. It is a proprietary format but is widely used and supported due to the popularity of the MS Windows platform.

AAC

Advanced Audio Coding (AAC) from MPEG is a lossy data compression scheme intended for audio streams. It was designed to provide better quality at the same bit-rate than MP3, or the same quality at lower bitrates (and hence smaller file sizes). The compression scheme and format for AAC forms part of the MPEG2 video and audio compression standard specifications and is an ISO standard, ISO/IEC 13818-7. This MPEG-2 AAC specification makes use of patents from several companies and a patent license is needed for products that make use of this standard.

The newer **MPEG-4** standard also specifies an audio compression technology that incorporates MPEG-2 AAC. This is known as MPEG-4 AAC, and is an ISO standard, ISO/IEC 14496-3.

Apple's popular iTunes service and iPod products have music available in AAC and this has led to an upsurge in the popularity of AAC despite the required patent license royalty payments.

RealAudio

RealAudio is a proprietary audio format developed by RealNetworks for low bandwidth usage. It was first introduced in 1995 and it became popular especially for streaming audio, i.e., the audio is being played in real time as it is downloaded. Many radio stations use RealAudio to stream their programs over the Internet.

Ogg Vorbis

Ogg Vorbis is a compressed audio format that is believed to be free of patents and royalty payments. The format originated from the Xiph.Org Foundation, a non-profit organization dedicated to producing free and open protocols, formats and software for multimedia.

Ogg Vorbis uses the Vorbis lossy audio compression scheme. The audio data is wrapped up in the Ogg container format, the name of Xiph.org's container format for audio, video, and meta-data – hence the name Ogg Vorbis. The Ogg Vorbis specification is in the public domain and is completely free for commercial or non-commercial use. There is growing support for the Ogg Vorbis format from software and hardware devices as well as online audio services.

Audio Formats

Format	Organization	Published	Non-Proprietary	International Standard
WAV	Microsoft	Yes	No	No
FLAC	Xiph.Org	Yes	Yes	No
MP3	MPEG/ISC	Yes	Yes	Yes
WMA	Microsoft	No	No	No
AAC	MPEG/ISO	Yes	Yes	Yes
RealAudio	RealNetworks	Yes	No	No
Ogg Vorbis	Xiph.org	Yes	Yes	No

Audio Guidance: Identifying Audio Formats

Consider

1. What modern audio formats are you aware of?
2. Can you name an audio format used in the past that we (typically) no longer use?

How Do I Identify Audio Formats?

Sound recordings come in a variety of shapes and sizes and have been around since the late nineteenth century. While there are a number of audio formats you may find at home or in a professional environment, each one presents different requirements for identification, physical handling, and playback equipment used. Some of the more common types of audio include ¼-inch open reel tape, audio cassettes, and grooved disc recordings.

Magnetic Media

Open Reel Quarter Inch Tape

Source: Open Reel ¼-inch Tape courtesy of National Archives and Records Administration, PDM

Magnetic recording tape was invented in 1928. However, it wasn't until the late-1940s that the recording industry fully adopted the format. Compared to grooved recordings, magnetic tape offered higher fidelity, longer record times, and the ability to be edited.

¼-inch open reel audio tape is supplied in reels having a diameter of 5-inches, 7-inches, and 10.5-inches and may vary in length depending on the tape speed. 1-inch and 2-inch open reel tapes (in width) also exist and were primarily used in professional environments.

- There are different types of tape base for ¼-inch width audio tape. Acetate and polyester are most common, although you may encounter PVC or paper base as well.

- An easy way to tell if you have one of the two most common types of ¼-inch tape is to hold the tape up to a light source. If the tape appears opaque it is polyester; if the tape is translucent, it is acetate.
- Tape speeds vary between 30 ips (inches per second) to 15/16 ips, with speeds of 7.5 ips and 3.75 ips being the most common.

Source: Audio Cassette courtesy of National Archives and Records Administration, PDM

Audio Cassette

This tape format was introduced in the United States in the mid-1960s by Phillips. Cassette recordings have been used for a number of purposes, including oral histories, lectures, conferences, and music. Since they were primarily used for convenience and not necessarily quality, cassettes are not considered to be a stable or high fidelity medium.

- Cassettes are made with polyester base tape, have just over a 1/8th inch tape width, and a slow playback speed of 1 7/8 ips, thus contributing to a limited dynamic range and frequency response.

Wire Recording

An alternate form of magnetic recording, the wire recording was initially introduced in the late 19th century, but further developed in the US during WWII. Spools are about 3 ½-inches in diameter. This format was ultimately succeeded by tape due to its low sound quality. While stainless steel wire recordings (post WWII) are not susceptible to the same types of degradation as open-reel tapes, they may be damaged easily and playback equipment is obsolete. You may find the wire recordings in your collection date from around the 1940s-1960s.

Source: Wire Recording courtesy of National Archives and Records Administration, PDM

Magnabelts

Source: Magnabelt courtesy of National Archives and Records Administration, PDM

These magnetic belts are similar in appearance to dictabelts and were used for dictation purposes, but do not contain grooves.

Digital Audio Tape (DAT)

Source: Digital Audio Tape (DAT) courtesy of National Archives and Records Administration, PDM

Digital Audio Tapes were introduced by Sony in 1987, and are magnetic tapes that store audio digitally. A cartridge houses a 4mm magnetic tape and recordings can be at, below, or above the 44.1 kHz sampling rate of CDs.

Grooved Recordings

Source: Grooved Recording courtesy of National Archives and Records Administration, PDM

You may encounter grooved discs at home or in professional collections. Discs vary in size and speed and have different coatings and substrates, which may include:aluminum, lacquer/acetate, plastic, and cardboard. Below are several of the more common types of phonograph records:

Wax Cylinders

Source: Wax Cylinders courtesy of National Archives and Records Administration, PDM

The earliest recording medium produced commercially, these are grooved wax- cylinders, which are the predecessors to the grooved disc. Wax cylinders can be solid or have a core of cardboard. They are very fragile and should be handled with care, including the grooves which can easily be scratched.

Attribution & References

- Audio file formats is adapted from: FOSS Open Standards/Comparison of File Formats , CC BY-SA
- How do I identify audio formats Courtesy of National Archives and Records Administration, PDM

4.3 SOUND BITES AND QUOTABLES

Introduction

Sometimes the words with the most impact are succinct, memorable statements. Sound bites, brief statements that zero in on the point of a larger or longer message, are often excised from interviews and articles, and presented apart from the context in which they were originally written or spoken. Slogans are phrases that express the goals, aims or nature of a product, service, person, or company. Quotes are memorable sayings extracted from written or verbal messages. Some move armies, while others make armies laugh. All are memorable and quickly become part of our cultural literacy, expressing a common sentiment or perception, and reinforcing our image of the speaker, business, product, or service (Taylor, 2004).

Watch Why You Should Add Sound Bites to your Content (2 mins) on YouTube (https://youtu.be/YcRrkUouCWA) for a brief overview of sound bites.

COMMON ELEMENTS OF EFFECTIVE SOUND BITES

Whether you are writing a document, preparing a presentation, or both, you will want to consider how others will summarize your main point. If you can provide a clear sound bite or quote, it is more likely to get picked up and repeated, reinforcing your message. By preparing your sound bites, you help control the interpretation of your message (Kerchner, 1997). Here are four characteristics of effective sound bites:

1. Clear and concise
2. Use vivid, dynamic language
3. Easy to repeat
4. Memorable

Your goal when writing a sound bite or quote is to make sure your idea represents all four characteristics. You won't always be creating the message; in some cases you may be asked to summarize someone else's written or verbal message, such as an interview, with a quote or a sound bite. Look for one or more sentences or phrases that capture these elements and test them out on your classmates or colleagues. Can the sound bite, slogan, or quote be delivered without stumbling? Is it easy to read? Does it get the job done?

KEY TAKEAWAY

Sound bites are brief statements that are often quoted.

CONSIDER

1. Choose a product or service that you find appealing. Try to come up with several sound bites, slogans, or quotes that meet all four criteria. You may look to company sales materials or interviews as a source for this exercise, and if you pull a quote from an online interview, please post the link when you complete your assignment. Discuss how the sound bite, slogan, or quote meets all four criteria in your response.
2. Match these phrases with their sources.

Product, Business or Person	**Sound Bite, Slogan, or Memorable Quote**
A. Nike	1. Where's the beef?
B. Barack Obama	2. Ask not what your country can do for you, but what you can do for your country.
C. Homer Simpson	3. Huge. That's huge, or huge.
D. Wendy's	4. Just do it!
E. John F. Kennedy	5. It's amazing how much you can get done when you're not trying to take credit for it.
F. Neil Armstrong	6. D'oh!
G. Paris Hilton	7. That's one small step for a man; one giant leap for mankind.
H. Franklin D. Roosevelt	8. A diamond is forever.
I. De Beers Consolidated	9. The only thing we have to fear is fear itself.

Check your Answer in footnote[1]

3. Indicate at least one sound bite or memorable quote and who said it. Please share your results with classmates and compare your results.

Attribution & References

References from original source

Kerchner, K. (1997). *Soundbites: A business guide for working with the media*. Savage Press.

Taylor, I. (2004). *Mediaspeak: Strategy. Sound-Bites. Spin: The plain-talking guide to issues, reputation and message management*. Toronto, Canada: Hushion House Publishing.

Notes

1. A-4, B-5, C-6, D-1, E-2, F-7, G-3, H-9, I-8

A podcast is a series of episodes made of audio voice recordings that someone can listen to either by streaming or downloading the episode.

A colourful line drawing of a microphone, labeled "podcast". **Source:** Image by Wesley Fryer, CC BY 2.0

Forms of Podcasting

There are many forms of podcasting, and you can mix up styles from episode to episode. Generally, the types fall into two categories: talking about a topic, or telling a story. When discussing a topic, you could be speaking on your own, with a co-host, or a guest. When telling a story, you could be telling a fiction or nonfiction story. You don't have to create a series of podcasts – it's perfectly fine to create a single piece!

Below are some pros and cons to the most common podcasting forms:

Interview Format

This format sees you (the host) interview guests each episode. You could interview multiple guests per episode, or stick to one at a time.

Pros:

- Your guests do most of the talking. You just have to steer the conversation.
- It opens your show to a new audience because your guests promote their appearance on your show to their fan base.

Cons:

- This is an extremely popular format so you might struggle to stand out.
- Interviewing is a skill that takes practice and patience.
- Finding a new guest for each episode takes a lot of work.

The Monologue

This format relies heavily on your ability to captivate the audience with your own ideas and speaking.

Pros:

- The podcast happens on your own schedule and at your own pace.

- Editing one voice is much easier than editing multiple tracks.
- Your audience gets to know you intimately.
- This is powerful for brand building.

Cons:

- It's a lot of talking. Speaking for 30 to 45 minutes is tiring.
- You don't have anyone to bounce ideas off.

With a Co-Host

With two hosts speaking, a natural conversation emerges.

Pros:

- You're only responsible for half of the conversation.
- It's easy to listen to an organic conversation rather than a prepared script.

Cons:

- You have to choose topics that you both know about.
- It can be tricky to keep the conversation progressing in a way that makes the audience want to listen. For example, inside jokes might not go over well with the audience.

Telling a Story

You might be telling a nonfiction story (think news or documentaries) or a fictional story (think plays and films). It could be narrated by a single person, or involve actors playing characters. Often scripted and practiced, they also often involve sound effects and other audio to build a visual scene in the listener's mind.

Pros:

- This can be a great way to tell a story on a budget. If you are a writer and want to give life to your creation, you can more easily make a podcast than a film.
- Can be highly addictive for listeners. Either they listen because they want to know about the nonfiction topic, or they tune in because they need to know what happens next.

Cons:

- Requires a lot of planning and practice. Either planning all the facts to make sure you've got factual

information, or practicing reading lines to get them right.
- It could involve a big team, either of actors or people researching topics to ensure a high quality product. This type of podcast is competing with other news sources (print and video) or other entertainment sources (shows and movies).

The Three Steps of Podcast Creation:

- Pre-production: Planning the show.
- Production: Recording the voices.
- Post-production: Editing the voices and adding in other sounds.

Pre-production: Planning the Podcast

Pre-production is all about knowing what you'll be talking about. It helps avoid rambling, and encourages coherent, captivating content. Think about your own professors: some of them might be really good at rambling and tangents, but others are not. If you, like most humans, aren't great at rambling, you're better off creating some sort of script.

All Forms

No matter what style or form of podcast you'll be creating, the following tips are helpful when planning your content.

- Create a structure of how you want the episode to flow and what content you want included.
- Practice your speaking voice:
    - You want to get a talking speed that isn't too fast or slow.
    - You want to clearly enunciate your words so you can be understood.
    - You want to make sure all changes in volume are on purpose for emphasis, not accidentally.
- Practice pausing instead of saying "ummm" or "ahhh". These sounds are usually what our brains do when they are thinking of what to say. Practice being silent when you're thinking.
    - Remember, the audience can't see you staring blankly into space. They won't know what is going on behind the microphone. You can always shorten pauses during post-production, but it's much harder to remove "ummms".

Interviews or Co-hosts

If your podcast will have another person speaking, it's always good to let them know ahead of time what is being discussed.

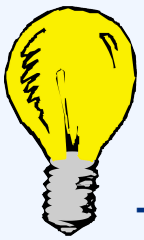
- Make sure that the guest is a good speaker, and, in addition to being knowledgeable, is able to speak clearly, informatively, and is engaging.
- Give out a list of talking points to the co-host and guests. This lets them know what will be discussed, so they are not surprised and can come to the session with some prepared thoughts.
- Ask the guest what they want to talk about, too. This helps create a conversation where both folks are knowledgeable and engaged.

Telling a Story

- Write out a script and practice it aloud. Make sure it sounds natural. You don't want to sound like you're reading something, so practicing the lines beforehand helps you get familiar.
- If you're doing a non-fiction piece, think of what background information the listener needs to know. Ensure that this material is present.

Production

- Record yourself using a phone or microphone.
- Make sure you pick a place with minimal outside noises. Never record outside unless it is intended for a specific purpose and you want intentional background noise.
- Keep a consistent distance from the microphone to avoid "popping Ps" and try not to vary your volume too much. Speak slightly louder than you normally would.
    - A "popping P" refers to the tendency for us to pronounce words that start with a P louder than normal. This is caused by blowing air when making the P sound.
    - People tend to start words or sentences strong, especially after a pause. Try to limit this.
- When interviewing someone, nod instead of saying "Yes". This will convey your understanding without causing issues with the audio file.
- If you have a co-host or guest, it might be more practical for each person to record their own audio using their own phone. You'll wind up with two audio files that you'll have to combine during the editing phase, but it might be easier than crowding around a microphone or figuring out how to connect two microphones to one recording device.



Tip: Pauses

Pauses are your best friend when editing. If you take a breath to psych yourself up for a line, take a 1-2 second pause. This will make removing the breath sound much easier later. If you mess up a line, take a pause, and redo that line. Continue as normal. Giving yourself the 1-2 seconds of silence makes your editing life much easier.

Post-Production

The Waveform

The waveform is a visual representation of an audio file. The X-axis (moving left to right) indicates time. The Y-axis (top to bottom) indicates the amplitude, which is essentially volume.

Watch The Waveform (30 seconds) on YouTube (https://youtu.be/NxoMlRGC3Ns)

There is a lot more science and complexity to a waveform, but for our purposes, we only need to understand it as a visualization of our audio recordings. Our main tasks will be chopping out bad clips, adjusting volume, and removing breathing noises.

Podcast Editing

The Two Main Techniques:

A cut and a fade is not just to make your hair look good.

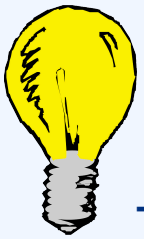
- **Cut** – A clean transition from one piece of audio to the next
- **Fade** – A gradual increase or decrease of the volume of an audio track. Think about how a voice might fade out near the end of a clip, or fade in at the start.

The Goals:

Our main goal is to take a bunch of clips and edit them so that they sound like one, uninterrupted clip. This is called "Continuity Editing".

This can refer to small-level, such as keeping the volume the same across the entire piece, and ensuring that cuts are done in between words and sound clean. Continuity editing can also refer to bigger picture things, such as cutting off tangents, and adding in important context. When someone says, "Oh, I forgot to add..." we might want to put that where it should have gone.

Here, the value of pauses should be clear. By pausing in between words and sentences, we have more room in the waveform to cut and arrange clips. If we speak quickly, there would be fewer places to make clean cuts.



Tip: Editing

Continuity editing: Editing audio clips to create a linear and consistent progression of content. This means editing out tangents, sentences that don't quite fit, and generally making sure that the final result sounds like one long clip, rather than a series of combined clips.

Another important goal is to get rid of Popping Ps. They are inevitable and take practice to change during the production phase. Speakers should always be striving to limit the Popping Ps and speak at with consistent volume and tone.

Sometimes, they are unavoidable or you don't notice. There are many strategies to getting rid of that "pop" sound. One is to fade in the P sound, another is to reduce the volume of just the P sound. In the mixer, you'll have to find the "P" sound and isolate it. It should stand out.

Popping P's – Example

When speaking into a microphone, there's sometimes a strong breath of air that seems to explode into the microphone.

These plosives (https://transom.org/2016/p-pops-plosives/) are worse on words with p's and b's. To avoid, position the mic at an angle instead of directly in front of the mouth, back away a little bit from the mic and use a pop filter or windscreen over the mic.

Popping P's – Text version of example
In this brief audio clip (2 seconds) the creator enunciates the words "Popping P's" and sound distortion is heard in the audio recording right at the point that the letter "P" is pronounced.

Source: Audio clip from *Liberated Learners*, CC BY-NC 4.0. Introductory text from *Tools for Podcasting* , CC BY 4.0

Audio Editing Functions

Inside an audio editing program, there are many functions that you can use to reach the goal of good continuity editing. While these functions are consistent across most (if not all) programs, how they are accessed will differ. Check out the program specific tutorials to get a feel for the layout. Below are some of the most common functions you'll use:

- **Select** – This lets you select a part of an audio track. Once selected, you can move it, cut it, and manipulate it.
- **Cut** – This will split the audio clip into parts, allowing you to insert something in between, move a piece somewhere else, or delete a part.
    - A form of cut that removes the beginning or end of a clip is called a "Trim". Basically, trimming the ends. Maybe you took a breath before you started, or looked for the stop button on your phone when you were done. In either case, you might want to get rid of that little bit at the start or end.
- **Merge** – This function takes two pieces of audio and merges them into one. Just like a cut takes a clip and turns it into two, a merge takes two and turns it into one. This is useful if you want to move this newly merged piece somewhere else, or apply an effect to the entire clip (to save yourself from doing it twice).

- **Amplify** – The Amplify effect will either increase *or decrease* the volume of a selection in decibels, the measurement of sound.
- **Fade** – Another common effect, this will fade in (increasing) or fade out (decreasing) a clip.
    - A cross fade is a type of fade that involves something fading in while something else fades out. The point is to have a seamless transition between two clips. An example would be introduction music that fades out as the speaker fades in.

Tracks

A "Track" refers to a recording of sound. If you were to record yourself speaking and load it into a computer, you would have one track. If you and a friend were each recording their own voice in a conversation, this would mean two tracks.

Audio programs allow for multiple tracks, and will play them all at the same time. Best practices say that we should separate different tracks. This way, we can change the background music speed or volume much easier, without changing anything else.

If we were to put everything on one track, things would get very messy very quickly.

Multiple tracks help us organize the audio files that we are using. Put the main host or narrator on the main track. Put background music on another, sound effects on another, and other guests/actors on their own track. The end result is the same, but it becomes much easier to find what you need and visually see the pieces that go into the final product.

Editing Software to Use

There are plenty of free audio editors out there. Audacity (https://www.audacityteam.org/) is a very popular choice. It is fairly easy to use and has an extensive suite of tools. There is a lot of support and resources for it as well, making it simple to find the solution to whatever problem you're having.

It is worth mentioning that, in 2021, Audacity changed their privacy policy in response to allegations that they were selling user data. (https://www.engadget.com/audacity-data-collection-privacy-policy-muse-group-145857557.html) If this is something that bothers you, there are plenty of other options to check out.

Dig Deeper

There are many options for editing audio and getting free sound effects to use. See below for some stuff to check out.

Ocenaudio

- Ocenaudio (https://www.ocenaudio.com/)(Free)

    - With a simpler interface than Audacity, this is a great choice if you're overwhelmed by Audacity's complexity, but still want something fairly powerful.

GarageBand

- GarageBand (https://www.apple.com/ca/mac/garageband/) (Free)
    - Got a Mac? This free Mac program is a good call if you're just starting out.

Audio Cutter

- Audio Cutter (https://mp3cut.net/) (browser based editor) (Free)
    - Working on a Chromebook? Don't want to download anything? Audio Cutter is browser-based and, while it is limited in functionality, it can be great if it does what you need.

You might also find something on your phone that works for you. Phone apps tend to be less powerful and more clunky to use (smaller screen, using fingers instead of a mouse or trackpad), but if you're only doing some light editing (trimming, minimal cutting, juggling only a couple tracks), it might work well for you.
Where to get free sound effects

- Freesound (https://freesound.org/browse/)
- Pixabay Sound Effects (https://pixabay.com/sound-effects/)
- Mixkit (https://mixkit.co/free-sound-effects/)

Attribution & References

4.5 EXPLORE, PRACTICE AND APPLY

Overview: Explore, Practice and Apply

Activities found on this page are designed to provide opportunities to explore, practice, and apply concepts presented in chapter 4.

Explore

Explore Activity 1

Explore an open source tool for creating and editing sound clips called audacity. View the media Audacity (https://youtu.be/W8Y-HHBkCxk?si=jXg_8Yn-Uf2R2OeT). Watch the video. Identify the six tips provided by the speaker. Consider, would you use this tool in a multimedia presentation? Why or why not?

Explore Activity 2

Google Slides is an alternative to PowerPoint presentations. Navigate to a video showcasing how to add audio such as Google Slide Audio (https://www.youtube.com/watch?v=JY_1EvatN-8). Consider, would you use this tool in a multimedia presentation? Why or why not?

Explore Activity 3

Analyze the Use of Sound in Media. Your instructor will provide with a multimedia clip (e.g., a podcast, advertisement, or video). Evaluate how sound elements (e.g., voice, music, and effects) enhance or detract from the overall message and user experience. Consider the ambient sound and their emotional impact.

Explore Activity 4

Explore: YouTube Audio Library (https://www.youtube.com/c/AudioLibraryEN)

Watch: How to download audio from the YouTube Audio Library (https://youtu.be/nh4AZzVYYaU?si=YQKAIlVV2mZxnvQJ)

Select two audio files from this library. Practice by downloading audio clips from the library. Playback the audio for sound quality. Locate another website offering free downloadable audio, explore how to download audio from this website.

Practice

Practice Activity 1

Navigate online and locate two sound editing platforms. Outline the features of these tools, now compare them. Which would you use? Why?

Practice Activity 2

Storytelling Through Sound**.** Obtain a short story or scenario and create a soundscape using ambient sounds and effects. Consider how the sounds may evoke emotions and guide attention without using dialogue.

Practice Activity 3

This is a group based activity. Select from one of the three types of sound/audio from the list below:

1. Background music
2. Voice-over or narration

3. Sound effects

Each group is to locate (online) 2-3 examples of how the selected sound is used in various multimedia presentations and the impact it has on the audience. Prepare to share your finding with your class.

Apply

Apply Activity 1

Navigate to 2 websites using the links provided: Pexels (https://www.pexels.com/videos/) and Pixabay . Select 1 short video without sound from one of these sites. Download the video. Now navigate to the YouTube Audio Library select and download background music for this video. Consider the following questions:

1. Why did you select this sound for the video?
2. How do you think this music enhances the video?

Apply Activity 2

Using the slide deck created from Chapter 1 apply section. Create two versions of your presentation and save them. Follow the steps included below:

In version 1 add the following:

- Add narration to a selected slide
- Add 2-3 sound effects to the slide deck, be selective and choose the effects based on the ability to enhance the presentation

In version 2 add the following

- Locate background music for the presentation

- Add the background music to the presentation

Apply Activity 3

Create an outline for a podcast episode. Define the format (e.g., interview, narrative), sound elements (e.g., music, voice-over), and steps needed for production.

Attribution & References

4.6 KEY CHAPTER TERMS

Chapter 4 Terms

AAC:

A lossy data compression scheme intended for audio streams.

Ambient sound:

Background sounds that are present in a scene or location (Filmmakers Academy, 2021, para. 1).

Amplification:

Increasing or decreasing volume.

Audacity:

A popular free audio editor.

Co-host podcast:

A form of podcasting in which there are two hosts carrying a conversation.

Crossfade:

A type of fade that involves something fading in while something else fades out.

Digital audio:

A type of audio signal that has been encoded into a digital format, which can then be processed by computers (Producertech, 2023, para. 2).

Digital Audio Tape (DAT):

Magnetic tapes that store audio digitally (Preservation Self Assessment Program, n.d.a)

FLAC audio:

A popular lossless audio format with compression designed specifically for audio data streams.

Frequency response:

A visual representation of how well an audio component reproduces the audible range of sound (Thomas, 2024, para. 2).

Grooved recordings:

Sound waves that are recorded as grooves on discs (Wallace, 2023).

Legacy audio:

Audio formats that are now obsolete.

Lossless compression:

Compression type where nothing is lost during the compression and the original data is restored upon decompressing.

Lossy compression:

Compression type where some data is lost during compression and upon decompressing the data is not identical to the original.

M4A:

An audio-only version of the MP4 format, often used for high-quality audio.

Magnetic media:

A medium that utilizes magnetic patterns to represent information (Computer Hope, 2024, para. 1).

Monologue podcast:

A type of podcast in which there is one host speaking to the audience.

MP3:

A popular compressed audio format that balances quality and file size.

Natural sound:

Like ambient sound but focuses more on the sounds of nature such as wildlife, wind or water (National Park Service, n.d.).

Open reel tape:

A type of magnetic media that uses magnetic tape and is not enclosed in a plastic cassette (Preservation Self Assessment Program, n.d.a).

Phonograph records:

Audio format consisting of sound waves inscribed on grooved discs (Preservation Self Assessment Program, n.d.b).

Podcast:

A series of episodes made of audio voice recordings that someone can listen to either by streaming or downloading the episode.

Sound effects:

A sound other than speech or music that is added into an audio recording ("Sound Effect", n.d., para. 1).

Storytelling podcast:

A form of podcasting in which the host is telling either a nonfictional or fictional story to the listener.

Voice recording:

The audio recording of a person or persons speaking.

Voice-overs:

An off-camera voice that narrates a scene or adds context (Tejeda, 2023, para. 2).

WAV:

An uncompressed format that offers high-quality audio but results in larger file sizes.

WMA:

An audio format developed by Microsoft to deploy in Windows environments.

Attribution & References

References for terms from outside sources

Computer Hope. (2024, September 19). *Magnetic media*. https://www.computerhope.com/jargon/m/magnmedi.htm

Filmmakers Academy. (2021, July 16). *Ambient sound*. https://www.filmmakersacademy.com/glossary/ambient-sound/

Producertech. (2023, January 3). *What is digital audio?* https://www.producertech.com/blog/what-is-digital-audio

Sound Effect. (n.d). In *Cambridge.org dictionary*. Retrieved November 14, 2024. From https://dictionary.cambridge.org/dictionary/english/sound-effect

Preservation Self Assessment Program. (n.d.a). *Audiotape*. University of Illinois at Urbana-Champaign. https://psap.library.illinois.edu/collection-id-guide/audiotape#audioquarterinOR

Preservation Self Assessment Program. (n.d.b). *Phonograph Record.* University of Illinois at Urbana-Champaign. https://psap.library.illinois.edu/collection-id-guide/phonodisc

National Park Service. (n.d). *Understanding Sound*. https://www.nps.gov/subjects/sound/understandingsound.htm

Tejeda, V. (2023, September 10). *What is a voiceover? A complete guide for beginners*. https://www.descript.com/blog/article/what-is-voiceover

Thomas, C. (2024, July 31). *What is frequency response and how does it affect my music?* Soundguys. https://www.soundguys.com/frequency-response-explained-16507/

Wallce, J. (2023). *Grooves*. Tangible Media. https://tangiblemediacollection.com/grooves