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6650 Final Project

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Finding the Groove: An Analysis of 70s and Modern R&B Production

1. INTRODUCTION

When I began this journey known as my Final Graduate Project, I was very sure of what to expect. I imagined that I would complete essentially two recording projects in two different mediums. Because my research subject is R&B music, I hypothesized that I would conduct a comparison study of production styles from the 70s and the modern-day. I anticipated that both worlds were entirely separate entities with few commonalities. Like the outcome of many studies, I was thoroughly surprised with my results. I discovered that production for both 70s and modern songs have lots in common and the influence of 70s production is still very much alive in today's music.

To begin, my final project is a combination of a musical production and an analytical research paper discussing and reflecting upon 70s and modern R&B studio production. For my paper, I was able to gather information from personal interviews, engineering literature, Internet music publications, documentaries, classroom course work, and my own personal findings. The information I obtained further explained the different parts of studio music production. On the musical side of things, I created a project to reflect my research findings. I worked with a number of different producers and musicians on three different songs. I selected two original songs, “We Can” and “Cruise With Me”, and a cover instrumental, “Chicken Pox”, originally by

Booker T. & The MGs. In addition to song production, I could not just stop at making songs that were recorded in two R&B styles. In order to further the authenticity of my project, I needed to use both 70s and modern production techniques. Thus, I recorded two different versions of each song to fit each music production era.

The birth of my final project did not happen overnight. I began pre-production for this project in May of 2013. My first step was to learn the "old" technique so I enrolled into the course Analog Production taught by Professor Chris Haseleu at Middle Tennessee State University. Prior to taking Prof. Haseleu's class, I had never recorded to tape. In that class, I learned how make an analog tape production from beginning to end. It was essentially a precursor to the 70s portion of my music production since I had to work within the perimeters of equipment only available during the 1970s. It was challenging, but by the end I understood the concepts and the work required to produce in a 70s style in a 70s studio.

Once the class concluded, I continued my education at Royal Studios in Memphis, TN, as an intern. Under the mentorship of Archie and Lawrence "Boo" Mitchell, sons of the former owner Willie Mitchell, I not only gained knowledge on 70s engineering, but I also deepened my knowledge on R&B production. I was able to see actual commercial recordings being made in a professional studio environment. I understood the different roles people play in the studio and how they differ between past and present production techniques.

Both my classroom work and my internship helped me actualize my musical project. Through combing my personal experiences with additional sources I was able to connect with my subject matter. Throughout this paper, I will explain the different techniques, equipment, and people used to determine and differentiate 70s R&B studio production and today's R&B.

2. MUSIC HISTORY

First, it is proper to start by addressing the music I researched before exploring the methods and tools used to capture it. Before the recording era existed, there was music. The focal point of my project is the R&B genre. R&B music derives from a combination of gospel and blues (Altman 36, 102). Gospel and blues has its roots in American slave spirituals and call-and-response songs full of syncopation and profound lyrical content (Ramsey 55, 60). R&B has been at the center of not only the African-American story, but the American political and historical experience as well. The music is made to provoke its listeners and performers. One simply cannot sit still physically or emotionally. The dynamic performance, visually and audibly, evokes dance and other responses from all who are affected by it (Salaam).

The instrumentation is important to the genre as well. As explained by Jonathan Feist, there is the rhythm section and a lead instrument. A rhythm section is defined as an ensemble that perform a "groove/accompaniment" to support a leading "instrument or vocalist,". Since the 1950s, the basic rhythm section has consisted of a drum groove, bass, and a chord progression. A drum set, electric bass, and acoustic or electric guitar, keyboard, or piano are apart of a typical pop music rhythm section. The rhythm section "evokes and defines the style and unique character of the song or composition" by establishing the "music's characteristic metric, rhythmic, and harmonic components,". The rhythm section is just one part of a great whole, so in order to complete the ensemble a singer or soloing instrument, such as a lead guitar or saxophone, will serve as a leading, melodic voice. Auxiliary parts such as background vocalists, string sections, horn sections, and other instruments can add additional details to a musical piece to create a more lush and intricate production (Feist).

Specifically, in R&B, drums, bass, piano, guitar, and singers are some of the typically instruments used (Stephens). As said by author Kalamu ya Salaam, the vocalists is especially center to the “timbre” of R&B music. It usually establishes distinction through its soulful, very raw approach to singing (Salaam). It is the most human and approachable part of the music because it is an instrument that most people possess.

Being that I selected to focus upon R&B music, I wanted to be in an environment that would produce the most authentic and accurate experiences available to me. With that idea in mind, I chose to create my project in Memphis, TN. Memphis is very vital to R&B history and all history as a whole. In Memphis, I had access to several historical sites and people that helped shape the style known as the “Memphis Sound”.

As stated in the article “A Brief History of Memphis”, Memphis was named a city in 1826. Memphis became a breeding ground for civil, political, and racial unrest as it was at center stage for slavery, the Civil War proceeding it, eventually the Civil Rights movement, and the assassination of Dr. Martin Luther King. Music played an important role in Memphis and the national story. The “Memphis Sound” emerged out the struggle of the people ("A Brief History of Memphis").

There were many key players who supported the Memphis music scene. In the same article, “A Brief History of Memphis”, it mentions that William Christopher “W.C.” Handy is recognized as the Father of The Blues and was the author of the first published blues song, “Memphis Blues”, in 1912. The world famous Beale Street is a musical crossroads for all who visit it. In its beginning, Beale St. was home to a mixture of underground activities, like gambling and prostitution, and hard workers in search of a great time and music ("A Brief

History of Memphis"). People such as the late B.B. King began their musical careers on Beale. Memphis is also home to the musical career of Elvis Presley where people travel in large packs to view his mansion Graceland on Elvis Presley Boulevard.

Memphis is also home to several historical music studios. Acts such as Elvis Presley, Johnny Cash, Howlin' Wolf, and Ike Turner all recorded at Sun Studios during the 1950s ("A Brief History of Memphis"". Once Sam Philips from Sun Records a set commercial music standard, the remainder of Memphis and the rest of the world wanted to either emulate or divert away from Philips' style in the 20th century (Gordon).

"A Brief History of Memphis" stated that Stax Records was central to the Civil Rights movement as black and white musicians were unified through music while the rest of the world was racially segregated. Artists like Sam & Dave, Isaac Hayes, Booker T. and the MGs, and Otis Redding were all apart of the Stax sound. The next street over Willie Mitchell's Royal Studios was producing hits for Al Green, Ann Peebles, and many others ("A Brief History of Memphis"). Even though Memphis is not the music capital it once was, people still celebrate the spirit of the past and continue to keep the music Memphis scene relevant in this modern era.

The Memphis style is partly unique because of where it started. During our interview, Robert Gordon, (native Memphian, historian, author, and filmmaker), said that the style originated in the Mississippi Delta in disenfranchised agriculture communities. The music became an expressive release for those in suffering. On the Memphis Sound, Gordon said, "it's a very personal expression," (Gordon).

"It's more real," is the way Archie Mitchell (son of famed Memphis producer Willie Mitchell that has worked with Memphis artists such as Al Green and Three 6 Mafia) described

the Memphis Sound. Memphis musicians' livelihoods were dependent upon music. The musical climate in Memphis is different from New York and Los Angeles where there are more work for talented musicians. In Memphis, because of the scarcity of opportunities music provided a basic means of survival so people are more inclined "to give it their all,". Archie said, "they had to make a statement and they had something to prove," (A. Mitchell).

Memphis musical expression is a "continuum," (Gordon). Gordon goes on to say, "Memphis itself has always been a crossroads of cultures." Because of the mixing of travelers from different economic and social statuses, Memphis became a hotbed for diverse musical expression. Gordon stated, "The Memphis sound is these different kinds of people, rural and urban, rich and poor, black and white, rubbing their shoulders together on the street. Everybody meets on the Memphis street, and that's where the Memphis sound comes from,". All places are known to use some sort of medium as an expressive outlet be it visual art, businesses, or film-making, "but Memphis has always expressed itself musically," (Gordon).

Gordon went on to say that the Memphis R&B movement saw its peaks during the 1970s. For "the first half of the 1970s Memphis was the defining sound in the nation." Stax Records was at its height of popularity in the beginning of the decade and Al Green saw the height of his super stardom so far as well in the 70s. "Stax was the sound of the street," and from the local streets it went national then worldwide (Gordon).

The Memphis sound still exists. Today, music in Memphis is influenced by nostalgia but it uses "contemporary" methods in order to summon the musical feelings of the past. Gordon mentioned that nowadays "you can record in your bedroom," but the appeal to recording in Memphis is that one has the ability to take music from the past and "infuse" it into current

sounds. “It always comes back around,” Archie Mitchell said. Gordon explained that Memphis is the perfect place for people to, “capture some magic from the past and infuse that into their work,”. These are my exact reasons for recording in Memphis.

The essence of the Memphis Sound surfaces in new music, such as Bruno Mars’ hit song “Uptown Funk”, which was partially recorded and written at Royal Studios, (“Willie Mitchells Royal Studios News”) and rapper Drake’s “Worst Behavior” video, which was shot at different famous landmarks such Beale Street and also Royal Studios (McNamara). These examples serve as a bridging of a generational gap (McNamara). The past is never forgotten in Memphis and musicians often pay homage to the people and places that made them (McNamara).

Given the rich history of Memphis, it was very easy for me create my musical project there. I decided that I would record my 70s production at Royal Studios and the majority of my modern project would be recorded at the Stax Music Academy. I chose those places because of their equipment, the musicians, and the prestige of being two original homes of the Memphis Sound.

As mentioned before, Royal Studios was the primary site for my 70s recording project and part of my modern project was recorded there as well. As stated on the Royal Studios’ “Willie Mitchells Royal Studios History Comments” page, Royal Studios was established in Memphis, Tn, in 1957. Many of Al Green’s most popular hits from the 70s were recorded at Royal Studios, such as “Tired of Being Alone,” and “Let’s Stay Together,”. Famed Producer Willie Mitchell was behind the sound of Al Green, Ann Peebles, and other artists associated with Royal Studios and his Hi Records. In more recent times, artists such as John Mayer, Boz Scaggs,

Paul Rogers, and Bruno Mars have all recorded projects at Royal Studios (“Willie Mitchells Royal Studios History”).

Although, Royal Studios has introduced modern recording equipment to its arsenal, such as an HD Pro Tools system, it still has many of the same vintage tools that was used in the decades’ past, like their MCI console and MCI tape machine (“Willie Mitchells Royal Studios Studios”). Gordon referred to Royal Studios as a “time tunnel”. Many who have seen the studio over the years say that the aesthetics have not changed much. It is almost like a time stamp (Gordon). I knew that Royal Studios was the best studio for the 70s portion of my project. Everything about the place rings of nostalgia.

Prior to it becoming an academy, charter school, and soul music museum, there was Stax Records. Stax Records was founded in 1960 by sister and brother team Estelle Axton and Jim Stewart. Taking the first two letters of their names, “StAx” was born. As mentioned in the article "A Brief History of Memphis", Stax helped bring about the “Memphis Sound” through hits like “Hold On, I’m Comin’” by Sam & Dave, and “Sittin’ On The Dock Of The Bay” by Otis Redding. Stax was known as a hit factory until its demise in 1976. Stax was declared bankrupt and was eventually demolished in 1989 ("A Brief History of Memphis").

Fast forward to today, the legacy of Stax has been resurrected as the Soulsville campus. For the purposes of my project, I recorded at the Stax Music Academy. Founded in 2000 and located in Memphis, TN, the Stax Music Academy is a music program designed to educate 6th to 12th grade students. The studio at the Stax Music Academy is far from the studio A from the past, and that is the exact reason why I chose it. The recording and control rooms at the academy are completely modern which was suitable for my modern productions. I also

wanted to record at the Stax Music Academy, because it was the perfect opportunity to bring the future and past together through music (“The History of Stax Music Academy”).

I worked mostly with the current and former students of the Stax Music Academy because of their understanding of the Memphis Sound. The purpose of the academy is to continue the Stax and soul music tradition through educating younger generations about the history through classroom work and performance. All day long, these children study the music of Memphis. Given their profound insight, I saw them as exemplary of what Gordon described as infusing the future with the past.

3. THE MEDIUMS: ANALOG AND DIGITAL

Before I divulge more on the music production, I will explain the mediums that recorded the music. The major dividing factor between 70s and today’s music production is technology. Technological advances have not only changed the equipment people use to record and create music, but it has also changed the sound of music. During the completion of this project, I was able to research and experience the different recording methods used to document music. The medium used for 70s recording is known as analog, and the modern technique is dominated by digital systems. Although, in today’s world the digital method is popular, people have found ways to incorporate the analog sound and equipment into their modern sound.

The sound of the 70s is analog. Analog is defined as, “the method of representing a sound wave with voltage fluctuations,” ("Digital Audio Recording: The Basics", Boyd). The continuous change in voltage contributes to the sonic character of analog productions, but it also contributes to the unpredictability of the medium.

At the center of the analog sound is the tape machine. It is a unique piece of machinery that helped bring the history of recording out of the dark ages. Prior to the invention of the tape machine, recordings were very crude and overall poor in quality. As stated by Steven Schoenherr in his "AES Historical Committee" publication, the telegraph was technically the first magnetic recording machine, created in 1844 by Samuel F.B. Morse. Thomas Edison's phonograph and Oberlin Smith's wax cylinder were inventions from the 19th century that eventually influenced the making of the magnetic tape recorder. It was invented by Nazi Germany and was used throughout World War I and II (Schoenherr). According to writer Daniel Keller, In the 1940s, during World War II, Jack Mullin, an audio engineer, confiscated two Magnetophon tape machines from a Nazi camp. The Magnetophons were special because they recorded approximately 30 minutes of audio and it the tape could be edited unlike past audio formats. In 1947, Mullin presented them to Bing Crosby at MGM Studios. Crosby went on to become an investor in the company Ampex and the first commercial tape machines were developed. Les Paul, famed guitarist, was given one of the first tape models. Soon after experimentation he discovered the ability of multitrack recording. Through a series of revisions, Ampex was about to make a 2, 3, 4, and eventually an 1-inch tape, 8-track recording machine. The company Scully make a 1-inch, 12-track machine, and Ampex responded with a 2-inch, 16-track machine. In 1968, it was MCI that eventually set an industry standard with a 2-inch, 24-track tape machine. It was popular throughout the 70s and it is a format still in use today (Keller).

Peter Elsea mentioned in his "Analog Recording of Sound" article that a typical 70s tape machine possessed a tape deck consisting of an erase head, record head, play head, capstan, pinch roller, and a guide. A tape is made out of plastic. The plastic is coated in a highly

magnetized material, typically iron oxide. The tape is then placed inside of the tape deck and rolled across the three heads a speed set by the user, such as 15 or 30 ips. The oxide on the tape is excited by the record head and the polarized oxide takes the shape of the signal thus recording it (Keller). The number of recording tracks depends upon the width of the tape, for example 2-inch tape can record up to 24 tracks ("Analog Recording of Sound", Elsea).

Besides the tape machine, there are other contributing factors that complete the analog process. According to Hugh Robjohns in his “Analogue Warmth” article, essentially, any electronic device that has a tube (or valve), solid-state, or transformer circuitry is considered as analog. That description encompasses almost any device that can be found inside of a studio. Vintage microphones, consoles, and processors all possess analog circuitry. Mechanical devices, like spring and plate reverb machines, are also analog. If computer technology is not involved, then it is most likely an analog device (“Analogue Warmth”, Robjohns).

There are many different devices and controls involved in the analog production. Much went into making a decent 70s recording, including lots of time. The equipment was not always cooperative and when things malfunctioned, often hiring a technician was the best solution. With all the potential setbacks awaiting unsuspecting engineers, why would people want to still use analog equipment? The most convincing reason is the sound.

The analog sound can be described as “full, punchy, gutsy, and raw,” (Huber, and Runstein). It has a particular “warm” quality that is sought after by many engineers. Analog warmth is defined as the sonic characteristics associated with non-digital “processing/recording equipment” (“Analogue Warmth”, Robjohns). Everything from the processors and effects units

to the tape and the tape machine itself play a hand in creating the analog sound (“Analogue Warmth”, Robjohns).

As previously mentioned, tape machines play an important part in the analog sound. All tape machines have different sounds because they all have different frequency responses ("Analog Recording of Sound", Elsea). The same tape machine by the same manufacture will have different responses for each tape speed ("Analog Recording of Sound", Elsea). For example, I worked with the MCI tape machine at Royal Studios. My analog production was recorded at 30 ips. The MCI 24-track machine is known to have a level response with minimal low end at 30 ips ("Analog Recording of Sound", Elsea). The sound is said to be noisier at 15 ips but has a larger bass presence (Endino).

In addition to the devices, equipment defects also play a role in the analog sound; tape saturation being a popular problem, Robjohns explained in his “Analogue Warmth” article. Tape saturation is an appealing part of the analog sound. Tape saturation is essentially distortion, non-linear to be exact. What makes analog distortion special is its effects on frequency and “harmonic content”. Harmonics are multiples of the fundamental frequency of a source. The timbre, or character, or a sound derives from its harmonic content. Even-order harmonics typically sound more pleasant while odd-order harmonics are dissonant and undesirable. Light tape saturation produces more even-order harmonics, which is associated with the warmth people enjoy from analog (“Analogue Warmth”, Robjohns).

Another tape machine defect that aids in analog warmth is wow-and-flutter (Keller). Wow-and-flutter has its positive aspects, but it also has a negative side. Wow and flutter is continuous tape speed variations (Borwick, 187). The “wow” are low speeds, while the “flutter”

are high speeds (Borwick, 187). Tape tension issues and faulty capstans are usually to blame for wow and flutter (Borwick, 187). Wow-and-flutter itself provides what is described as a grungy sound. Many mixdowns and overdubs of the same songs exacerbated the grunge and it became a signature sound of late 70s recordings ("Analogue Warmth", Robjohns). Excessive wow-and-flutter can change the speed and sound of the signal, creating inconsistent tempos and extreme pitch changes that are not usually musically welcoming (Kefauver, 310).

From Hugh Robjohns "Analogue Warmth" article, he states that self-erasure is another defect that causes analog warmth. Self-erasure is the term used for magnetic tape material separate from the space on the record head. As the becomes worn, the frequency response changes. The wear and tear that naturally occurs during tape playback erases higher frequencies overtime and gives a warmer sound each time damage occurs. Transients especially become duller ("Analog Warmth", Robjohns).

In all, analog sound is very interesting and distinct. Analog device combinations create sonic textures that are unlike any other process. Even defective issues, such as tape saturation, wow-and-flutter, and self-erasure can create a sometimes pleasant "warmth" that is distinct to analog. Tape technology helped set the precedent for future recording systems. Because of analog equipment, the digital method was made possible.

Before the 80s, nearly all music recordings were analog (Waldrep). Digital technology has dominated the musical scene since its creation. The once popular tape machine is now apart of niche markets and the conversations audio enthusiasts. It has revolutionized the music world and its effects are seen everywhere. Although not the same as its analog ancestor, digital technology is mostly modeled after its predecessor. Digital systems can be as versatile as the user

desires and can indeed be connected to analog and hardware devices, but at its basis, it starts with a computer.

Douglas Boyd mentions that all microphone signals begin the same way regardless of the medium used to record it. It starts with a sound coming from a source. That energy enters the microphone and is converted into "electrical energy,". This is where the process changes. Instead of continuing as an analog signal, process known as A/D conversion begins in digital systems (Boyd). Analog to digital conversion, or A/D conversion, is essential to digital recording, as stated on The McGill Physiology Virtual Lab website. Without it, digital recording would be obsolete. Basically, A/D conversion is when an analog signal is changed into a digital one that is then transferred into a computer. An analog-to-digital converter (ADC) is the device used to complete the A/D conversion ("A/D basics"). Once in the computer, the analog signal becomes a series of 1s and 0s known as binary code, thus making the signal digital (Boyd). The processed used for binary coding is called Pulse Code Modulation (PCM) ("All About Digital Audio, Part 1", Robjohns). Each number is a bit and the larger the bit word size, the better the sound quality. Word size also determines the dynamic range ("Basics of Digital Recording", Elsea). The signal is then sampled as mentioned in the article "A/D basics". Sampling is basically discreet snapshots of an analog signal. Analog changes constantly over time, while digital signals are like pictures of an analog signal taken at different points in time, giving the wave a square or block like shape. Sampling takes place at a specific frequency known as the sample rate. It is measured in Hertz (Hz). The sample rate must be high enough to handle the frequency of the signal, which is twice the highest perceivable frequency within an analog wave. This frequency is known as the Nyquist rate ("A/D basics"). For example, a CD has a sample rate of 44.1 kHz meaning that

the highest frequency that can be recorded is approximately 22 kHz, which is well beyond the highest frequency in most musical recordings (Boyd). Once the data is processed and stored in a computer, a digital-to-analog converter (DAC) changes the digital signal into an analog one for the purpose of being monitored in speakers ("Basics of Digital Recording", Elsea). The digital signal has to go through a digital-to-analog conversion so that the resulting data can be heard in the same manner it was recorded ("Basics of Digital Recording", Elsea).

Like analog systems, digital recording does not exists without its own problems either. When the sampling rate is below the Nyquist rate, aliasing occurs ("A/D basics"). Digital clipping, known as aliasing, truncates the top of a sine wave and gives it a square shape, which produces distortion and odd-order harmonic content ("Q. What is 'aliasing'"). Aliasing occurs when a frequency is more than half the sample rate ("Q. What is 'aliasing'"). The sample rate sets a harsh limit for the frequencies in the system and odd harmonics under the limit are created inside of the signal, thus creating unpleasant sounds ("Q. What is 'aliasing'"). Aliasing is based strictly on mathematical calculations and musical harmonics are not produced from it ("All About Digital Audio, Part 1", Robjohns).

Another special component to digital music production is the DAW. A DAW, or Digital Audio Workstation, is computer hardware or software used for "storing, editing, and processing digital audio information," (Kefauver, 552). Pro Tools, Logic Pro, and Nuendo are some of the more popular software programs just to name a few. Most editing softwares include plugins that help take the place of bulky outboard processors and effects units. Recording, editing, mixing and all other functions can be done inside of a program.

MIDI is also a significant part of digital production. MIDI, or Musical Instrument Digital Interface, is is a "digital communications language" that permits computer devices to connect with one another (Huber 1). MIDI data can be recorded and edited in sequencer software (Huber 1), which allows users to manipulate music in a way that was impossible before MIDI (Huber 2). Instead of using digital audio clips for instruments, MIDI simply serves as a set of instructions that only tells devices to change or perform sounds (Huber 3). MIDI controllers are readily available on the market for anyone to buy. It is affordable and "portable," (Huber 6). A MIDI workstation can be combined in one device (Huber 7). A MIDI controller can come in any shape or size. It can be a synthesizer, a sequencer, or audio recorder (Huber 7). It is remarkable that any musical sound imaginable can be packaged into one machine.

Digital recording is a linear process, unlike its analog predecessor ("Analogue Warmth", Robjohns). Because it has a linear function, it has a relatively flat frequency response. The flat response gives digital productions a distinct sound as well. The digital sound can be described as "clean" and "pure" (Griffin). It has also been said to be "static" (Gardner). There is no additional equipment coloring the sound of a digital signal when it only interacts with the computer.

In all, analog and digital are very different but they also have their similarities. The principles of audio remain the same no matter if one is working with digital or analog equipment (Snyder). The importance of the fundamentals do not change with mediums (Snyder). There are several systematic parts that have remained the same throughout time: the analog signal, gain structure, and processing and effects (Snyder).

First, microphone signals begin as analog signals and end the same way. All microphone signals start as analog waveforms (Boyd). The initial part of the signal chain is analog and also it

ends in that form. In analog systems, the wave stays analog. Even though mic waves eventually become digital, they go through a digital-to-analog process to revert them into an analog wave for monitoring (“Basics of Digital Recording”, Elsea). Regardless of whether is it begins as an analog wave or a digital one, they all become analog signals for the purpose of playback.

Secondly, for both mediums, it is imperative to have the right “gain structure” or balance of levels as Robjohns mentions in his “Practical Mixing” article. Before settling things into the mix, it is important that all tracks are not at noise floor level to prevent environmental nuances from seeping in but still allowing headroom to prevent peaking the ceiling and distortion. Essentially, the dynamic range has to be contained within the boundaries of the equipment and the music. A good method to ensure boundaries are not being exceeded in digital or analog production, the faders are most “effective” “at or near 0db or ‘unity gain’.” This position helps maintain a good gain structure (“Practical Mixing”, Robjohns).

In addition to gain structure, all processors and effects serve the same purposing in analog and digital mixes. The purpose of processing and effects is to bring the mix together and help it unify, thus the reason for the term mixing according to Robjohns in the “Practical Mixing” article. Equalization helps create “clarity” and separation of different instruments. EQ also builds overall character. Reverb is meant to “create the illusion of depth.” In many cases, the idea is to imitate a real, natural space tailored to the individual instruments and the overall mix (“Practical Mixing”, Robjohns). Too much reverb can cause a smearing of sound or sounds, and too little reverb can give an overly dry and dull impression. It is the engineer or producer’s duty to make sure the right balance is achieved for the musical production.

In conclusion, there are several rules that remain the same for all engineers and audio systems. Analog signals required for mic sources and monitoring, appropriate gain balancing, and proper usage of effects and processing are all principles of engineering that do not change in either digital or analog systems. It is amazing that technology has not eliminated or altered basic music engineering.

Beyond their similarities, there are pros and cons, which for some are only preferences, that entail both analog and digital systems. Analog is notorious for being unstable, expensive, and time consuming. People will suffer through it all for the analog sound. Digital on the other hand, is disliked for having too many options, a bland sonic texture, and clipping. Regardless of the negatives, users enjoy the software versatility. There is much to be said about the positive and negative aspects of both mediums.

Starting with analog, one con is that it can be an unstable and unpredictable. As mentioned above, wow-and-flutter is a destructive feature of analog. When wow-and-flutter unsuspectingly occurs, one has to "rock" the tape or adjust the reels in order to maintain the same amount of tension to prevent damage and wow-and-flutter (Huber and Runstein). This is not necessary in digital recording. The computer maintains its own speed and if it is becomes defective, it can be repaired or a part can be replaced. The recorded data will not be destroyed by a failing computer speed. The process will be slow or production will stop, but no data will be lost. Along with wow-and-flutter, tape speeds overall are inconsistent (Borwick, 723). There is a 0.5-1% deviation from the recording speed (Borwick, 723). Although there have been great technical strides made in tape since its invent, wow-and-flutter is still inherently apart of tape technology according to Hugh Robjohns in his "Analogue Warmth" article. Although minuscule

in newer model machines, wow-and-flutter is yet to be eliminated. “Word-clock stability” in the digital world is what wow-and-flutter is to the tape world, but they do not pose the same problems. A digital wow-and-flutter is not even detectable (“Analogue Warmth”, Robjohns). Wow-and-flutter can be used as an interesting effect, but for the most part it is an undesirable component of analog recording.

In addition to instability, analog can also be very expensive. In the 70s, an analog console could cost between $20,000 to $40,000 (Everest, 293). MCI JH24 tape machines, the very machine I used for my project at Royal, prices today at nearly $8,250 (“Mara Machines”). When searching for a tape for my project, I priced tapes from $200-$300. Fortunately, I was able to record my project on an older tape from Royal Studios. A person may not have to purchase another console or tape machine, but there is a $200-$300 investment one must make multiple times. Peter Elsea states in his “Basics of Digital Recording” article, analog equipment is costly, demands more maintenance, and troubleshooting is not always an easy fix. Many analog devices comprise of mechanical parts that breakdown by nature. Digital devices do not have many “moving parts”. Computer technicians are readily available in today’s society while tape and analog equipment technicians are not always easy to find. Digital systems are cheaper, have easier upkeep, and are easier to troubleshoot than analog systems ("Basics of Digital Recording", Elsea).

At the end of the day, the cost of an analog production also depends on one’s available budget. I interviewed drummer Steve Potts on this topic (who played on my 70s project and was a session player on numerous recordings at Stax Records and Hi Records), and he gave a very insightful opinion on project budgeting. I asked Potts if there was more pressure to complete

song arrangements before recording to tape and sessions are costly. His response was “I think it depends on the person’s money.” I found his response to be very surprising and informative. Prior to speaking with Potts, I was under the impression that in tape recording it was imperative to have the song in its finished form since there is a limited amount of time on the tape and that tapes are too expensive to buy multiples. In order to save money and time, I assumed everyone rehearsed their songs prior to recording and put on tape the final arrangement of the song (Potts).

Potts mentioned that some projects have a large enough budget to record everything during the process including all of the rehearsals. The project manager has to decide if he or she wants to invest in more tape and studio to record everything or complete the song structure before recording to tape. Potts prefers to have time work on a song as long as needed in order to achieve the best version. It is important to “feel free” instead of having to “rush” the process (Potts).

DAWs are a great alternative to analog because they are indeed cheaper (“Basics of Digital Recording,” Elsea). According to Potts, in digital, money is not a problem. It is not an issue if you own digital equipment and do not have to rent studio space. Since the advent of digital technology, it is easier than ever for any person interested in music to build a studio of their own conveniently inside of his or her home. Home studios are on the rise because of their affordability and the user-friendly equipment. It is not always necessary to go to a commercial studio in order to record digital music (Griffin). All one needs is a digital recording machine, such as a computer, a mic, monitors, headphones, a synth or MIDI instrument, and an audio interface, and like magic he or she has a basic home studio (Roos). You don’t have to purchase “a hard unit” in order to use processors and effects units in Pro Tools, the user can employ

plug-ins that serve the same purpose (Griffin). I interviewed bassist Ray Griffin on this subject. He too performed on my 70s project and was a session player for Hi Records. He also operates his own home studio and understands the benefits that come with it. Griffin said, "I can do what I want up here and I can take as much time as I want." He mentioned at places like Royal Studios, there are "time constraints" (Griffin).

Home studios are normally, cheaper, more affordable options for people who are interested in music production but do not have the funds or have the necessities for larger, more expensive commercial studios. Besides just home studios, studios in general are much smaller and affordable nowadays. Part of my project was recorded at the Stax Music Academy, which essentially consists mainly of a small booth and a control room. Digital recording is more mobile. I recorded and mixed my digital project in a multitude of places, including my bedroom, Stax Music Academy, my aunt's home, and Royal Studios just to name a few. Because of the availability and affordability of equipment, people not only have the potential to buy what they need for music production but they can build it in their homes.

Because a person can take as much time as he or she wants in smaller digital recording settings, some digital projects could take much longer because there is always the option of returning to a project. I completed my analog tape project in three days: two recording sessions, one day for mixing. My digital project took nearly two years because of the flexibility. There was no pressure to complete the project within a certain amount of time because I did not have to pay for anything except for two vocal sessions for "We Can" at Royal Studios. Even in digital recording, you only have to be concerned about finishing a song within the time you paid to use the studio. In analog recording, you have to worry about both studio time and tape duration.

Money adds another degree of responsibility that is often a part of analog production. In addition to not having to pay for most of the project, I could spend more time working on song production. There was no pressure to have the song formats completed ahead of time like what some people encounter in analog production. I had the option to work on it during the recording process sometimes. If I had an idea, I would have my musicians record it, and I would save it for later potential usage. I recorded several different parts in a multitude of ways with the idea that I will use one or a combination of takes for the final product. There is more opportunity to craft a creative project in digital when you are working in a smaller environment. The down side to smaller spaces is that there might be "a limited amount of space at home," (L. Mitchell). Boo Mitchell (son of Willie Mitchell who has engineers songs for John Mayer, Boz Scaggs, and most recently Bruno Mars), mentioned during our interview, "you can't cut a nine piece band in your living room." The music industry was driven in the 70s by a large corporate machine but over time as technology evolved, the ability to work independently become a viable possibility. I can create and distribute music on my own, if I so desire, without the aid of a larger business entity. Digital production can essentially be produced anywhere (L. Mitchell).

Lastly, the analog process is said to be very time consuming. Everything from prepping the tape machine before recording, to patching cables in the patchbay, changing controls on the console and outboard gear (Griffin). It takes a special amount of patience when working with analog tape machines and transports. There is a long "rewind time" in general when using tape (L. Mitchell). In analog, the rewind and fast forward functions have a wait time that is nearly equal to real time. There is a slight delay for tape to start when the play button is pressed. Also, the tape does not stop instantly when the stop function is enabled. Software program transports

work almost instantaneously. All documentation for analog sessions have to be recorded manually. Settings for plug-ins and additional session notes can be saved inside digital software programs instead of filling out recall sheets. The user can also type notes into the program, therefore all of the information for the system can be filed in one place.

Tape editing is a very time consuming process. It also can be very difficult (Griffin). In order to remove recording errors, tape had to be marked at a certain time position and the tape had to be physically cut. In our interview, Ray Griffin recalled a time when an engineer cut part of the tape and discarded it only to find out later the trashed tape contained parts of the take needed for the session. There is no undo function in tape splicing which is why digital is valuable in his opinion. Because editing is difficult and tedious at times, there is more pressure for musicians to perform as perfectly as possibly, hence the reason for the rehearsals before recording the final take. Editing tape was a highly sought after skill. Griffin said there were some engineers who were so good at editing tape to where no one could tell if an edit was made. It takes time and precision to accurately edit tape. If a mistake is made in editing tape, then it will take additional time in mending the spliced tape or, in the worst possible case, re-record the missing sections (Griffin). Even though it takes a significant amount of time to work with analog, people who enjoy recording with analog systems are drawn to the process and the "'hands-on' approach" (Gardner). The "tactile... practicality," helps engineers feel connected and powerful in the process (Gardner).

Despite all of the issues that come with using analog equipment, there are people who will undergo all of the "stress" tape can cause just so they can get the analog sound. Even the "bad" parts of analog, like tape saturation, can make analog records sound great. The vintage

quality of analog is often romanticized instead of criticized for its shortcomings (Koehler). Tape loses sound quality over time and/or because of faulty equipment ("All About Digital Audio, Part 3", Robjohns). Either tape machine parts like the heads become "dirty", or the tape naturally loses its treble with continuous usage ("All About Digital Audio, Part 3", Robjohns). Digital quality does not change as it ages ("All About Digital Audio, Part 3", Robjohns). Either digital files will playback or they will not. Only errors, deletion of files, severe destruction of the data storage will destroy the digital sound. Even though the digital sound does not perish with age, many people do prefer the analog sound.

Analog systems are at times unstable, costly, and requires lot of time and attention. "The technical limitations and imperfections" of the tape process ("Analog Warmth", Robjohns) are well known by all who have had the pleasure (or displeasure) to work closely with the medium. For some, the imperfections are what makes the analog process so unique and appealing.

Digital systems have just any many pros and cons as analog. There are several positive aspects that come from digital technology, but just like analog, digital is not perfect. Three perceived negative characteristics of digital systems are a plethora options, a flat frequency response (depending on the preference of the engineer), and clipping. Beyond the poor qualities, users enjoy the versatility that comes with the software.

To start, digital systems possess too many options. Some may think more is better, but that is not always the case in digital recording. Because there is so much variety, engineers and producers may have the tendency to not make the best or most efficient decisions. For one, there are more tracks available (L. Mitchell). This is an upgrade from the 24-track recording days of analog. The problem with having nearly an infinite amount of tracks is that some engineers will

go overboard and mic everything that has a recordable surface(L. Mitchell). All of those tracks have to be mixed as well, which adds more time and work to the engineer's jobs.

With the MCI and many other analog consoles, the engineer is limited to the number of group assignments one can make. In DAWs, such Pro Tools, the number of groups are nearly infinite. The problem with the ability to make unlimited amounts of groups means that there is more work for the engineer. Switching between multiple groups can slow the process and mistakes can be made by an engineer that starts editing waveforms with wrong the groups selected. Again, having too much can create more problems.

Before the invention of note tuning plugins and editing software that could put out of time songs "in-pocket", performers had to rely solely on their timing and tuning ability. Nowadays, engineers can "fix" many performance issues with a variety of software programs. Because problems can be easily fixed, engineer run the risk of spending a lot of time pocketing and tuning if the musicians are not up to par. To solve this, Boo suggested, "get a drummer that can play in time, get singer that can sing in tune." Even with great performers, there will be mistakes. There is a budding engineering culture of "perfection" that influences lots of modern recordings. Therefore, engineers will still edit to the point of perfect timing and tuning, which can be a very time consuming task. Having too many options in digital systems can be a serious distraction. This prolongs the production process when engineers have to take additional time for miking, editing, and mixing.

In analog, the amount of equipment and the capabilities of it does not compare to that of digital equipments, but that is not always a bad thing. the engineer has to have a knowledge of their devices so that they can achieve the appropriate sound more quickly. A certain amount of

expertise is required in analog engineering in order to work efficiently and effectively (A. Mitchell), and because one works with a smaller arsenal than digital plugins, he or she can get results more quickly. Once an engineer has learned his or her analog equipment well enough then, according to Archie, "you're like the computer then," meaning that he or she can recall settings rather quickly without much or any experimentation. It was the great 20th century composer Igor Stravinsky who once said that the artistic limitation freed him as an artist and allowed him to be more creative ("Stravinsky"). Although, analog is limited in its abilities, the limited manipulation of analog equipment and sounds are embraced by some as an "artistic expression," (Huber, Runstein).

Secondly, the digital sound is not the most appealing sound to all that encounter it. Although, the sound has a flat frequency response, it is too flat for some. Some people find the sound of analog to sound better than digital ("Analog Warmth", Robjohns). They want the analog sound but the convenience of digital ("Analog Warmth", Robjohns). For those who enjoy tape, a digital "flat and linear response" is not as sonically pleasing as a tape sound ("Analog Warmth", Robjohns). It has become a science to people who desire to add "life" to the relatively flat digital sound.

A number of software and hardware devices have been created for the exact purpose of merging the two worlds ("Analog Warmth", Robjohns). Vintage Warmer by PSP, Analog Channel by McDSP, and Phoenix Tape Emulation by Crane Song are a few software plug-in ("Analog Warmth", Robjohns). The analog CLASP system is another way analog sound lovers incorporate it into their digital productions ("Endless Analog CLASP", Robjohns).

Hugh Robjohns article “Endless Analog CLASP: Tape Recorder Integration System” explains the phenomena known as the CLASP system. The analog CLASP (Closed Loop Analog Signal Processor) is a device that digital users can use to give more life to their sterile digital recordings. Audio is recorded onto a tape and into a DAW. SMPTE code is not required since the tape information is perfectly synced with the digital system. The tape rewinds itself due to sensors in the CLASP system. The tape machine is only used to add an analog tape sound to the user’s signal chain and he or she can edit and manipulate files as normal inside the DAW. The tape does not accrue the same damage as normal analog tapes after long-term usage. The same project can also be recorded at different speeds, such as 15 and 30 ips. For example, so tracks can be recorded at 30 ips for clarity and quality, while other instruments can be recorded at 15 ips to create lower frequency depth. It is mildly more expensive than plugins, but is more cost effective that using all analog tape machinery. It allows engineers and producers to be more creative with analog sound since the limitations of the tape machine from the past are imposed upon the process. Different tape speeds, no self-erasure, and no tape editing are some of the perks one can have by using a CLASP System (“Endless Analog CLASP”, Robjohns). Although it is a great alternative, it does not fully replace the full analog process.

In conclusion, using analog elements or imitation equipment does not substitute for an authentic analog sound. Just like no one machine works alone to make an analog sound, no one plug-in can be used to sum up the analog process (“Endless Analog CLASP”, Robjohns). The digital plug-ins are decent attempts at re-creating it, but they are artificial in nature. Even if the algorithms for the programs are made to be “non-linear” like analog, they still will never be non-linear like analog because the variables do not exist in the plug-ins. It can be compared to

leaving out pieces to a puzzle. One cannot not expect to see the full picture without using all of the parts. The sound will be incomplete. That does not necessarily the product will sound bad, but it cannot claim analog authenticity. The only way to truly achieve a true analog sound is to use all analog equipment. After all of the "analog" software processing, nothing is better than the real thing ("Analog Warmth", Robjohns).

Digital clipping is another negative aspect of digital production. A distorted digital signal resembles a square and when it has a square shape, only odd harmonics are produced ("All About Digital Audio, Part 2", Robjohns). Digital clipping is based strictly on mathematical calculations and musical harmonics are not produced from it ("All About Digital Audio, Part 1", Robjohns). It is impossible to surpass a digital "ceiling," which is why a clipped digital signal becomes a "flat plateau," (Waldrep). On the other hand, analog devices can produce decent sound beyond their maximum levels (Waldrep). Clipping in tape sounds better than digital clipping (Griffin). In digital, the sound wave is blunting cut off and, as Griffin stated, "You got a lot more forgiveness with the analog." Clipping in a digital system is not as forgiving and nothing pleasant comes from overdriving it ("Practical Mixing", Robjohns). Even though analog has a smaller dynamic range, the system can be slightly overloaded and colorful tape saturation settle into the recording ("Practical Mixing", Robjohns). Tape saturation occurs with analog tracks clip and the waveform rounds off, creating a warmer sound (Griffin). The resulting clipped analog signal is not perfect but is sometimes an acceptable estimate since the stronger presence of even harmonics sound more pleasant (Waldrep). Analog does not have a flat frequency response, the non-uniformity of the curve is what gives analog its character ("Practical Mixing", Robjohns). Analog sound inherently has a shape or color while life often has to be

given to flat digital recordings (“Practical Mixing”, Robjohns). In digital, in order to receive the sonic benefits of distortion, it is probably better to distort the analog source or add distortion plug-ins to the desired track and record it at a non-clipping level. In that instance, the user will maintain the sonic quality of the sound and gain the distortion he or she wants. Although tape is noisier than digital, many people prefer the analog sound over digital.

Despite its less appealing qualities, digital has completely changed production as the world knows it due to the versatility of its software. As Kyle Snyder states in “Latest From Focal Press”, Many DAWs, like Pro Tools, mimic analog signal chains. Analog boards typically use a top-down model, starting with an input section, sends section, EQ, monitor section, pan, output fader, and a routing section. A channel strip in Pro Tools much so reflects this setup except it appears in a different order. Virtual consoles are ever similar to their analog predecessors. One difference between an analog board and a Pro Tools mixer is that there is no built in EQ in Pro Tools. The inserts allow for EQ and any other effects and processors to be added to the channel strip. Pro Tools basic channel strip top-down model begins with the insert section, sends, input, output, and level fader (Snyder). Users literally have an analog board at their fingertips except one can just use a computer mouse to navigate through every facet of music production. Ray Griffin said, “It’s not like being in the real world,” because you do not have to physically touch and move objects.

Plug-ins are extremely important to digital engineering. Beyond processors and effects, there are also plug-ins tuning, digital instruments, and even distortion. A plug-in exists for practically every thing a person can imagine they would like to change or fix in an audio file. Users can use plugins without the hassle of patching outboard gear and finding settings. It is

easier to switch plugins in the digital domain because no patching is required (A. Mitchell). The routing is done for the user automatically (A. Mitchell). Settings are sometimes available as presets so engineers do not have to do trials and error to find what they want from a device.

Automation is easier in digital. Users have the ability to change the level of individual parts in a DAW (Griffin), while the track is not playing. A track can be automated without ever hearing the playback because of the visual aid. In analog, you have to print the changes in real time, and if the change is wrong, the engineer will have to rewind the tape and play it in real time to automate it again.

The most valuable part of digital software is the editing tool (Griffin). With the editing tool engineers can copy, paste, delete, and move parts. This helps with correcting timing issues and selecting takes to use for final production. Even if an engineer wanted to copy parts of an analog production, besides it being a tedious task, individual track cannot be copied. All tracks have to be played as correctly as possible in order to make analog copying work. Also, tape cannot be copied and retain the same quality (Katz). With each reproduction the sound deteriorates (Katz). Every copy of a digital recording maintains the same quality from the original. The only way a digital recording can lose its quality is it is converted to a medium of lesser quality. For instance, converting a WAV or AIFF file to MP3 results in a loss of quality because MP3 files are smaller and severely compressed.

The production process is easier and more “user-friendly” because of versatile DAW systems. Automation, grouping, processing, and editing are just a few of the aspects of the engineering process that can be completed faster than in all analog systems. Some complain

about digital software having too many options, but in the same breath people appreciate the versatility that comes from digital software.

In all, every medium has problems and good qualities. Tape has a superior sound in some ways and digital has superior editing and processing abilities. Most experts I spoke to said that the biggest issue with analog is that it is a long and time consuming process and they said that clipping was the least valuable part of digital systems. It was Archie that taught me that the issues that come with the process are not really issues at all. Archie's answer to what are the pros and cons of both mediums was shocking yet interesting in my opinion:

> There are none.... They help each other. There are no good and bad points. They're actually both great.... The good and bad points come from the people that you're recording!.... The equipment has nothing to do with it.... It depends on who you're recording no matter what you're recording on.

All the things that people would consider to be good or bad in either medium, "actually work together…. Once you develop a formula, it works for everything. It works for either way," (A. Mitchell). I learned that most of the power lies within the person, not the system (A. Mitchell).

4. MUSIC PRODUCTION

With the invention of analog and digital equipment, techniques and standards have been created to make usage easier for those who encounter these systems. Standards also unify the people who work in the music industry. Many of techniques that people use today derived from the 70s. Multitrack recording and the actual magnetic recording tape have been a major influencing factor in modern recording and mixing techniques.

Starting with the 70s, the magnetic tape was center to recording. It was the storage system for analog systems. Magnetic tape also had its limits. Magnetic tape is allotted approximately 30 minutes of recording time (Keller) and 24 available recording tracks on two inch tape ("Analog Recording of Sound", Elsea). Because of these limitations, it was imperative to have a plan prior to recording. Steve Potts, explained the process him and other studio musicians would have to endure to because of the time limit. Potts said that often before starting a take they would be informed of how much time was allotted to record. If there was not enough recording time, musicians would have to wait for a new tape to placed on the machine (Potts). Other times the tape would run out during a take and they would have to redo the song (Potts). The downside of running out of tape is that that moment is forever lost (Potts). During one session, after achieving the right "groove" and completing a very good take, Potts said he remembers hearing the engineer announcing over the talkback system that they ran out of tape. He remembered feeling and thinking, "we'll never get that again! We'll never get that feel again! Never!" In order to compensate for mistakes such as that, Potts said that engineers would splice tape and edit takes together with the hopes to salvage and replace the missing parts of the song. Steve Potts experiences are the type of situations that are avoided through careful planning. Producers should have a vision of the song readily accessible to the players in order to save time and resources (L. Mitchell). Sheet music or scratch recordings are two forms one can use for session preparation. It "forces" all involved to be more prepared and professional when entering the studio (L. Mitchell).

Again, tape also only has 24 tracks. The number of instruments or microphones were either limited. Thanks to digital systems, modern recording session do not present the same

issues as magnetic tape. Data storage devices can record for nearly as long as you want with as many tracks as you desire. In digital, you record continuously without much stopping since there is more space available while tape is more expensive and less time is allotted to record due to the availability of space on the tape (L. Mitchell).

I recall as an intern at Royal Studios, Archie was producing a song using only analog equipment. He wanted to record the three singers on one mic at the same time in order to save tracks. The singers were used to recording separately on separate tracks using digital systems. Because of this dilemma, the singers were not able to perform. Because of the nearly infinite track availability in digital systems, there are many possibilities. The user can record people separately on using several tracks, record him or herself multiple times, or duplicate the same tracks in order to create a choral effect (Griffin).

Like magnetic tape, multitrack recording was very essential to analog tape recordings (Everest, 14). Before, multitrack recording, people were recording into monophonic recorders meaning that tracks were recorded to and played back on one speaker channel (12). Eventually, monophonic recording evolved into multiple tracks being recorded into one monitor channel (13), and then many tracks or signals feeding into a stereophonic or two channel monitoring system (14). Because of multitrack recording, mic isolation and the use of multiple microphones was possible (19). Ensembles no longer had to crowd around one microphone to record. Gobos and isolation booths could be used to prevent mic bleeding, such as the ones used in Royal Studios. More isolation also means more overdubbing opportunities (20). Archie mentioned during our interview that Willie Mitchell did not record everyone at the same time. He recorded the rhythm section first, then overdubbed all other parts such as singers and strings. According to

Archie, “everything was done in steps.” Willie Mitchell’s step by step “formula” helped with production, because he would be able to listen to individual parts better as opposed to all instrumentalists playing together at once (A. Mitchell).

I used the very technique Archie mentioned for both my 70s and modern production projects. Although musicians were isolated, in my 70s production, more musicians played at the same time. For instance, the rhythm section (drums, bass, guitar, and keys) recorded, then the horn players (baritone, trumpet, alto), if needed, and then the singers recorded. The recording time did not take as long with that process. During my modern production, I took a different approach. All of the digital MIDI sequenced instrument tracks were recorded individually. For the live parts that I recorded, many of them were overdubbed during a separate session. On “We Can” the percussion and all of the vocal parts were recorded during different sessions on all different days. On “Chicken Pox” I recorded the bass and drums together. All other parts were recorded separately on different session days.

I decided to record my digital project first because I wanted those songs to serve as references for the analog production. I knew that pre-production for 70s and modern productions differed in some aspects. Given the technological capabilities of DAWs, I was able to create ideas and return to them, if not completed, by saving my data. With analog, the saving process would not be as simple. I could have charted everything by hand or recorded to tape but it would have taken more time and resources (and money) in order to complete pre-production with only analog material. With that being the case, I completed digital demos for my 70s musicians to use in rehearsal. All of those steps I took were a part of pre-production.

Pre-production is the a process that occurs prior to recording the final product. Preparation is imperative to music production because goals are created. Going into a production blind does not always produce good results so taking time before the recording often shortens the actual production process and creates higher quality art.

Pre-production was important to the 70s and analog production in general because it helped save time, resources, and created better performances. Production moves a lot faster when people know what they are doing. It took approximately 4 hours to record each song over the course of two days. Rehearsals meant for "perfect" recordings. When a song was recorded as perfectly as possible, then the tape editing process would be eliminated, not as many retakes would be necessary, the number of tape reels would be limited, and the studio costs would be lessen. Rehearsals also helped solidify song arrangements. It was possible to make tape cuts and edits but the song would lose its musical qualities because of the lack of pre-production (A. Mitchell). Poor pre-production could be apparent if the musicians or producers are not prepared (L. Mitchell). Analog recording "forces" all involved to be more prepared and professional when entering the studio (L. Mitchell).

Pre-production could make for speedier digital productions if people incorporated rehearsals into the process, but sometimes people create things as they record them because of the accessibility of the technology, especially when one does not have to pay for studio time. Steve Potts mentioned that in analog production the amount of tapes a production used depended on the budget, but in digital production the budget may not be of the same importance since one does not have to stop recording and change storage systems after 30 minutes. There is more room for experimentation, especially with song structure because of the ease of editing (L.

Mitchell). Ideas do not have to be set in stone prior to recording because resources and time rarely become issues in digital production (L. Mitchell).

Once pre-production concludes, one can move on to making the production. During production, all of the ideas from pre-production are recorded. The musical arrangement becomes an audible performance. Professionalism and feel are two production aspects that impact the degree of musical excellence.

Professionalism is important to the production process. Without it, the quality of the production will suffer. It changes between analog and modern productions. The professionalism has to be present when creating analog productions. All of the musicians I interviewed said that they perform the same way in analog and digital. I attribute that to their high caliber of professionalism. As Ray Griffin stated, "You can't make a mistake." In analog recording, the musicians have to play the song in its entirety (A. Mitchell). All parts have to be recorded live since copying and pasting parts can be very difficult (A. Mitchell).

Professionalism sometimes is sacrificed in digital productions. "Easy" and "lazy" are two words I heard often while conducting interviews for my projects. Most of the people I talked to said that production is easier because of digital technology, but the ease of process has caused laziness amongst the people who use it. Because so much can be "fixed" with digital software, musicians may not give their best effort when recording. Boo specifically mentioned singers and horn players sometimes talk in between takes meaning the engineer would have to edit those parts. During analog recording, performers were less inclined to talk or make noise in between takes (L. Mitchell). If there was noise in between parts on analog tape, the engineer would find those spots and punch in to record silence (L. Mitchell). That takes time away from other

important tasks, so it is better if musicians practice being quiet while recording. Boo and Archie both believe digital production has made some people "lazy". Archie sees computer productions as a "bail-out" due to the sophisticated programs that can correct mistakes. According to Archie, in analog there is no other intervening factor, such as plug-ins, to influence the production. Analog is a more "natural" process; there are not any "gimmicks" meaning excessive processing and effects (A. Mitchell).

The "feel" of a song is established during production. It is a part of every analog and digital production Gordon explained that, "it's what the song tries to project and tries to evoke." From the beginning of my project, I understood that "feel" was key to each song. If one cannot recall the lyrics or the melody, he or she should at least remember how the song made him or her feel. The concept of "feel" is highly significant to establishing tempo, timbre, and other musical components in any music production. The concept of feel differs for each medium.

The idea of feel is key to analog music. Feel is highly important to any song, but it takes on a special meaning in analog projects. The feel in analog production is created by harmonic communication between the musicians. When the musicians move at the same time and compliment each others' styles, then the music normally has a "good" feel. When there is no cohesive form, especially when there are wild shifts in timing, then the feel is determined to be "bad". It is a combination of timing and musicality overall. The idea of "feel" is more of a big picture approach and is something that naturally occurs.

Feel was dependent upon the professionalism of the musicians for productions from the 70s. For producer, Willie Mitchell it was of the utmost importance. Ray Griffin mentioned when working with Willie Mitchell, "he would even leave in the mistakes because of the feel."

According to Archie Mitchell, Willie Mitchell began as a jazz trumpeter and incorporated his jazz and music theory background into his R&B productions. All of his songs were heavily "orchestrated" and detailed. He charted all of his music. "It's all about a groove", said Archie about Willie Mitchell. All other parts were just embellishments and ornamental, but the feel was the most important piece of the song (A. Mitchell). I wanted to emulate the style of Willie Mitchell, so it only made sense to work with the people he had worked with before for my analog production.

In today's world, music can become completely artificial because of the ability to create songs that are nearly perfect. No player can perform perfectly in time and it would be near impossible to edit a tape project to a perfect tempo, as is the trend in today's music. The over detailing and editing of songs can actually cause songs to lose their "feel" and become more rigid, sterile, and mechanical sounding. It is helpful that if there is a bad beat or note it can be fixed in a DAW as opposed to trying edit tape, punch in, or live with a bad mistake.

In reference to digital editing, Archie stated, "It has a lot of value but you can't depend on it completely." A dependency on editing "takes away from the creativity of the artist and production," and, "the record won't be real anymore." A extreme case of over editing is when artists rely on lip syncing live performances because the studio recording is completely unnatural. Autotune is a tool used to help create the illusion that a musician has more talent than he or she actually possesses. There is no real production process when people are depend on editing tools to shape a song (A. Mitchell).

The engineer has the ability to edit and copy sections of the songs and arrange them as desired in post-production. The downside to editing "feel" is that the music can become

redundant, monotonous, uneventful because there is no variation in the parts. Less production work is required for the musicians but the music may suffer. In analog, the process of recording the same parts can take an extremely long amount of time if the musicians do not perform correctly. Redoing the same takes is a potential consequence of tape recording. A positive result of tape recording sections is that the music is normally more interesting because of the fact that it is nearly impossible to perform the same part exactly the same every time. There is no software to "fix" timing and notes, so the feel relies solely upon the ability of the musicians. There is variety in tape recordings and sometimes it is the mistakes that make analog songs exciting and memorable.

In one aspect, it is more human to rely on feel. No one is perfect, everyone makes a mistake at some point. Just like people have to live with the negative consequences of their actions, it is the same idea of living with musical accidents when recording to tape. In my own project, I preferred the feel of my analog projects over my digital projects. The tape productions sounds more natural. Although the digital songs are technically correct, they do not possess the same "soul" element as the songs recorded with live musicians.

My project was successful because of all the people involved in the production process. Three key roles in any studio production are the producer, the musician, and the engineer. Within one musical production, there can be multiple persons assuming the same title and there can be multiple titles used for the same person. Throughout time, the fulfilling of the different categories have simplified and complicated with the changing of technology. Some aspects have stayed the same since the 70s, while there are some apparent differences between a 70s production team and a modern day team.

The definitions for producer, musician, and engineer have not changed. Duties have expanded with technological advances and in certain cases perception has shifted, but the titles are set in stone. Again, the medium intervenes into the process. From the analog days of the 70s to digital production of today, expectations have changed in some ways and remained the same in others.

Archie stated that producers have to be able to arrange and organize the instrumentation of song. Archie feels like a true producer "is involved in every aspect of the song,". He or she looks, "for the attitude, notes, and the character,". Producers are involved in the engineering process to insure the "right" sound is being implemented. The producer has more control in the sessions since everyone has to appease him or her. The project is not done until he or she is satisfied. Archie believes that a producer is someone who guides a project from its beginning until the end (A. Mitchell).

Engineers basically have to bring all of the instruments together, "and make them all sound good," (A. Mitchell). As Archie said, "that means no, it's not a drummer's record, it's not the bass player's record, it's not the guitar player's record...it's a record for everybody." In all, the engineer's job is to guarantee that the sounds balance and compliment one another in order to make one cohesive song. As quoted by Archie, "nothing can take over. You have to make the whole record a marriage," (A. Mitchell).

The musician's job is rather self-explanatory. His or her job is to perform vocal or instrumental parts. The musician helps the dreams of the producer come to life. As mentioned earlier, the rhythm section establishes the basic musical characteristics of the song, including tempo, rhythm, and chord progression. It is the backbone of the music. The lead instrument or

singer is the part many people remember from a song. It is the part many people take away from a recording.

Those are the basic definitions of a producer, engineer, and musician. They are all highly important jobs to music production, and good production normally encompass the best performances from all of the team. The names take on different meanings for some and the tasks have changed since the 70s to today.

Starting with the 70s, musicians needed to visually see each other to communicate and create a "feel" that helps maintain quality (Everest, 20). That idea rings true today when live musicians are in the studio. Archie stated that the engineer had a greater influence in the analog process because all of the work "comes from you," meaning there is more of a personal connection to the project due to the physicality of the process (A. Mitchell). During the 70s, musicians, engineer, and producer work closely together in order to create quality music productions (Everest, 19). In analog recordings, the engineer relies heavily on the producer to make sure that all musical parts compliment each other (Everest, 18). Because there is not much room for error, in analog, Archie said, "you really have to know your craft,".

In Archie's opinion, musicians who are able to record well to tape are usually highly skilled and extremely professional because of the "no mistakes" standard. Once the rhythm section establishes tempo and other musical parts then that places pressure on the singer. The vocalist is not allowed to make mistakes because they would be obvious over what the band has already established. The singer has to move with the band (A. Mitchell).

Vocalists become better at their craft because of analog training according to Archie. Vocalists learn voice control from recording to tape. A vocalist can become more attentive to

their voice in the same way the producer would pay attention to it. They will recognize their mistakes and fix them without the producer always having to point out their errors. The singer subsequently builds "confidence" and a sense of pride because they were able to achieve their musical goals. Archie believes that if musicians have the capability to record in analog then they should be capable to record in any medium because there is not any additional "help" as far as devices are concerned. The success of the song is based purely on "raw talent" (A. Mitchell).

In today's production world, things have changed dramatically for producers, musicians, and engineers. Digital technology has influenced every part of music production. Some things have been improved, while others have not.

Starting with the musicians, the use for live musicians can be completely replaced by a keyboard controller (A. Mitchell). Archie mentioned that not many drummers are keyboardists, but the person who plays keyboard can play the drummer's instrument on his or her digital keyboard. The keyboardist has become extremely important in music production because of digital technology. Archie said that, "The digital world has made every person that plays keyboards a more valuable commodity," because all of the instruments one would need for a live production is at their fingertips and the sounds can be manipulated to sound like the real instruments (A. Mitchell).

In addition to a rise in keyboardists, the producer role has changed. People compose instrumentals or songs for people to add lyrics to and post them online and title themselves as producers. Selling a song on the Internet does not make the that person a producer according to Archie. He feels as though it shows that the "producer" does not "care" any about the song after he or she is paid. Archie says it is impossible to be a producer if he or she has never personally

met the individual with whom he or she has created a project. The song to Archie “is something sacred” (A. Mitchell).

My belief is that the responsibility of producer is transferred to the artist if he or she is not working with another person in the studio. The initial person who created the instrumental is a composer and a producer until it is sold. Nowadays, the term producer is used as a synonym for “composer”. During my internship at Royal Studios, I was able to witness the confusion that arises from using the two words interchangeably.

While interning at Royal, during the same tape recording session I have mentioned before, there was a dispute as to who was the producer. Archie and the composer had a disagreement as to who was producing the song she had composed. The composer felt that because she had created the instrumental that she should have a say so in how it would be recorded. Archie’s argument was that she was never supposed to produce the record, she was to create the music and he would produce the song. Production literally came to a halt because the roles were not clearly defined from the beginning and some of the confusion came from the composer thinking of herself as being a producer because she had composed the track. Archie being more experienced proposed a question of why his services would be required if she was the producer. Archie knew the artist better and had a vision for the song. Eventually, the composer learned the difference between production and composition through that experience.

According to Archie, “people are lazy,” and do not enjoy the repetition that comes with recording parts over and over until the parts are correct. He uses the analogy of using a remote control versus manually changing television channels with the buttons on the console. Many

people will choose the remote over walking to the television because people like the convenience and they do not have to exert more of an effort to get the results they want (A. Mitchell).

Archie stated that in digital recording, musicians have the option of not having "to work as hard," due to the editing and plug-in abilities. There is not the same pressure to achieve near-perfection like in analog recording because, "the computer does the rest.... It's more like a luxury,". The singer may have the attitude that it can be fixed later and once it is fixed "you're getting a false feel of what they really can do". Instead of the singer taking the time to fix their tuning or levels, it is fixed in the program. The singer may believe that the digital performance came from him or her. In reality, as quoted from Archie:

> It's all an image because they never did it in the first place. The computer did it. It's a good cheat sheet....They don't work as hard because they know it's available. (A. Mitchell).

Referencing the same situation at Royal, the band could not harmonize or blend as a group. Archie was concerned about not only them being able to record to tape but also how they would even be able to "perform" the song if in concert. Archie commented on the story during our interview, "that's a prime of example of terrible, terrible work ethic." The ease of recording digitally made them somewhat lazy and unprofessional. "They've been taught the wrong way to record.... You can't keep doing the wrong thing and expect to be successful,". Perhaps if they had been "trained" on analog as Archie would suggest, then they could possibly be better vocalists. The musician, "puts more pressure on the person pushing the buttons and they make you do most of the work for them," (A. Mitchell).

According to Archie, learning the analog process also helps engineers understand digital equipment, “better”, instead of, “vis versa”. The reason why is because when engineers are used to working solely with DAWs, they expect the same setup when entering other studios with DAWs because the majority of them all work the same. Engineers in digital studios typically know what to expect. In analog, every studio is “different” and the engineer has to “learn” every part of the room, including the best recording techniques for the space, how the patchbay works, and the outboard gear. As said before, plugins can be seen as “bailouts” and “crutches” to digital production. There are no bailouts in analog production, the performer has to deliver to the producer whatever he or she demands. The responsibility of a good production falls solely upon the producer, not a plug-in or an engineer running a DAW (A. Mitchell).

There are more people in today’s world that do not appreciate or understand the music production process (A. Mitchell). The level of respectability has changed in some ways (A. Mitchell). The computer can do a lot of the work that would take time to plan to execute in the analog world (A. Mitchell).

Post-production is the final process. After the recording sessions, the songs are still not finished. The engineer and producer must work together to create a sonically appealing song. The mixing sessions are highly important because it ensures audio quality. I used the same techniques I normally use while mixing. The only difference is the equipment. First, I edit. After editing, I mix the songs. I start the mixing process by balancing the levels. In order to create space in the mix, I move on to panning. I keep all solo instruments, the snare, the kick, and the bass center. Stereo instruments, such as pianos that have a left and a right channel, are panned usually mid- to far into equally into each field. Accompanying mono instruments, I pan as well. I

pan instruments that have similar timbres or frequency ranges in opposite fields to prevent clashing. For instance, on my modern version of "Chicken Pox", I have several guitar parts. In order to keep them from masking, I panned them. After panning, I added processing. I started with EQ to help give each instrument their own individual character. If an instrument masked the lead instrument, then I would cut that part of the masking instrument's frequency range. Next, I used compression to contain the dynamic ranges of the instruments and to add additional "warmth". Last, effects were added. I used reverb and delays as tastefully as possible. The only goal with those were to prevent drowning everything in a wash of reverb and create an ambient, natural space.

As I alluded to earlier, the difference came with the equipment. In my 70s production, I used all electronic hardware for mixing. I used the board EQ units, outboard compressors, and an EMT plate for reverb. I was forced to really listen to the effects the hardware had on the instruments. I used mostly plugins for mixing in my digital project. When I heard a difference in the plug-in, I had a habit of lowering the level a few notches. I was constantly second-guessing my decisions in digital. I liked the sound of the hardware better, but initially, it felt strange moving physical dials to change sounds. Archie had stated that the engineer is more connected to the analog process. Not only was a connection formed to the process, but I felt as though the responsibility of the task increased. I instantly took my job more seriously. The ease digital make musicians and engineers lazy alike if one is not careful. There is no computer software performing tasks for the engineer in analog. When mixing in the box, all of the routing is done for the user. Also, changing a setting is done with the click of a mouse or one can use presets. Because of my inexperience with the analog equipment, I had to really search for my settings. I

had no “go-to” functions I could use like in a plugin and I did not know the analog devices well enough to know what to use for what instrument. I felt limited with my reverberation options in analog because I was used to have every space known to man at my fingertips (or tip) in Pro Tools. Initially, I struggled during my first trials, but I eventually learned to adjust to each medium.

For my project, I had to use both digital and analog recording methods to produce a modern and a 70s R&B production. I chose to record the same three songs, “We Can”, “Cruise With Me”, and “Chicken Pox”, for the reason of being able to do a real comparison between the two styles. The changes and similarities would be more identifiable by using the same music. By playing the roles of engineer, producer, songwriter, and composer along with any other tasks I assumed, I was able understand to the equipment and music in a number of different ways. Before I divulge on the production, I will introduce the team that helped make my project a reality. To begin, I will discuss my digital production since I completed it prior to my analog project.

5. FINAL PROJECT ANALYSIS

The first song I started working on was “We Can”. It was song my niece, Jasmon Tate, had written. There was no music, so I decided to create the background elements for it. I started by notating a basic chord progression. I envisioned the song being a duet. It is an inspirational song about working together to heal the world, so it only made sense to me to have more than one singer.

After the chords, I knew I would need help creating the rest, so I asked Landon Bowen to help with production. He was an intern at Royal Studios as well in the summer of 2013. We used

Logic Pro to sequence the music. He was able to complete the percussion and drum patterns for the rhythm section, but once our internship ended, so did production. Eventually, he sent me an email containing his version of the song, but the production was not the best. Not all of the instruments were in key. I knew I would need someone else to correct the issues. It was suggested by my coworker at the time to contact Brandon Chornes. He was a former student of the Stax Music Academy and was very talented in music production. Working with Brandon was extremely helpful. We worked well together, and because of his musical talent, he was able to execute the music ideas I had as producer. Brandon co-produced, composed, and performed on all of my digital productions. We worked at in studio at the Stax Music Academy.

Brandon and I continued working in Logic Pro 8 to finish sequencing "We Can". The live recording and mixing were completed using Pro Tool 10. Once the song structure was finished, I realized the words my niece wrote were not in a traditional form. I wrote another stanza for the second verse and removed a stanza from the bridge in order to help the lyrics fit the music. I recorded one live part for "We Can" and it was cymbal splashes performed by David Pruitt. David was a student of the Stax Music Academy.

Finding suitable singers was not an easy task. Initially, I recorded my niece, Jasmon, and Jarveous Williams, another student from the Stax Music Academy. My niece was not vocally skilled enough to sing her own song, and Jarveous left town before I could redo some of his vocal parts. To replace my niece, I asked David's sister, another Stax Music Academy student, Deonna Pruitt to sing the female vocal. To fill in the missing Jarveous parts, I asked Brandon to sing those. It was not until I completed my analog production that I found the singers for "We Can". Stefanie Bolton and Marcus Scott ultimately were my singers for "We Can". I kept the

takes of Deonna and Brandon for background vocals. Stefanie and Marcus sung on “We Can” for my tape project and I decided it would be easier to have the professional singers perform the digital project as well. I rented space at Royal Studios and paid Stefanie and Marcus. The final vocals were completed in two session, one for each singer, on two different days. At Royal, the vocals were run through the analog MCI board and recorded with Pro Tools HD 11.

The second song from my digital production is “Cruise With Me”. We used Logic 9 to sequence it. I recorded and mixed the vocals in Pro Tool 10. I wanted to continue creating original works, so I asked Brandon if he had any music I could use to write a song. He played several beats he created, and eventually I decided upon one. I took the song with me and rearranged the structure. I wrote the lyrics in one night. The melody came to me first and then the lyrics followed. I had no intentions on making a “love song”. I started with “I feel so free” and figured love makes people feel free so I stuck with that theme.

I returned to the studio the next day to continue production with Brandon. I felt as though the instrumentation could be developed more, so several more instruments were added to the song. Once I was satisfied with the song, I needed to find a singer. I had one singer in mind initially. She wanted $150 to do the session. I felt that even though she was talented, she was 17 and I was not convinced that she was a professional session singer. Brandon suggested I ask April Horner, another Stax Music Academy student. She agreed to record the song and she was easy to produce.

The last song from my digital production was “Chicken Pox”. Unlike the other two songs, it is an instrumental. It was a cover I chose that was originally recorded by Stax Records recording group Booker T. & The MG’s. I selected the song because it was recorded in 1971.

One of my research topics is the 70s recording era therefore explaining my reasoning for selecting “Chicken Pox”. Also, it was a song by Memphis musicians. I would be able to do a serious comparison of the different R&B styles from the 70s and the modern. My original productions were made by Memphis musicians, but I did not have a production that showcased how today’s musicians would interpret a 70s cover. “Chicken Pox” would be that experimental piece.

At first, I recorded David Pruitt on drums, but the initial version was distorted because of issues with Pro Tools 10 and the interface. Made a second attempt at “Chicken Pox” with Brandon playing drums, David McKenzie on bass, and Dallas Dodson on guitar and keys. There were a few rehearsals prior to recording in order to create a song structure. I did not want to do an exact cover of the original. We incorporated a new introduction and inserted a new bridge section. The new sections came about from me listening to David McKenzie improvise during rehearsal and I said I wanted to add those parts to the final production. Also, to make it more modern, I wanted to use a distorted guitar sound.

During the first session David and Brandon’s parts we recorded live. Next, I recorded Dallas’ guitar parts. We debated over whether the original song had one guitar part or were there overdubs. We ultimately decided it was easier to record an overdub. The keyboard portion was recorded at my aunt’s house. Dallas used his own personal MIDI controller. We were able to step-record in places that Dallas had issues playing live. Keys were not Dallas’ primary instrument, so we had to find creative ways to make those parts interesting. Mostly, the rhythm was changed in parts, the chord textures were altered in places, and glissandos were used to make the keyboard lively.

I mixed the majority of my project on Pro Tools LE 9 at home and Pro Tools LE 11 at the Memphis Slim House studio. I travelled a number of places between Tennessee, Kentucky, and Georgia editing and mixing my digital project. I finished mixing the songs at the Slim House so that I could reference them on a different monitoring system.

In all, I learned many lessons from my digital production. I experienced the mobility of digital. As I stated, I travelled to three different states while mixing my songs. I also used three different studios: Royal Studios, Stax Music Academy studio, and the Memphis Slim House studio. Pro Tools systems work the same virtually everywhere and my hard drive storage unit was compatible with every computer I used. Using different tape equipment is not always best because tape machines have different sonic characteristics, but in digital, there are no sound changes due to its flat frequency response.

Also, I was able to easily edit tuning and timing issues with my DAW. No musician is perfect. I knew when selecting my artists, that they would make more mistakes than more seasoned professionals because most of them were young. They were skilled musicians, but most of them were used to live performances and not studio recording. I spent a large amount of time pocketing, quantizing, and tuning. I wanted to show how editing software can "fix" many issues, and also to use the modern technique of creating perfect tempos and notes. "Perfecting" a digital production can create boring music. In many of today's digital songs, it is the same beat and same parts repeated. It can take literally minutes to create a song because many of the sections are identical thanks to the copy and paste functions found on DAWs. To avoid the loop cycle in my final project, I produced variations of each section. They are mostly similar, but to make the production more interesting I included small changes in each part.

I was also able to achieve "perfection" because of MIDI and step-recording abilities. Production was faster when my MIDI musicians could perform parts live, but when they made mistakes or were not able to play certain parts, we step-recorded. In the 70s, musicians had to perform all parts live. Also, the only way to fix errors was to play those parts live again. Step-recording can occur outside of playback and does not have to be recorded in real time with the music. It was a very helpful tool in completing my project.

Like Archie said, the keyboardist is a very valuable player in digital production. The majority of my instrumentation were performed with MIDI keyboard controllers. I made sure that the people that programmed my music were decent keyboardists and also had a knowledge of sequencing software. Given the amount of sounds available in the programs used, one played nearly every virtual instrument in all of my productions.

Because of Pro Tools and Logic Pro's editing features, I could make new arrangements of the same song. I used a multitude of different takes, and I copied and pasted lots of sections to produce the songs for my digital project. Completing a feat such as that in tape would have been extremely time consuming and risky since detrimental mistakes can ruin production. Thanks to the modern DAW, I could make new arrangements with ease.

I alluded to the fact in my introduction that I was surprised by my modern digital production results. I initially believed that I would record and mix my project using all digital equipment. As I discovered, I was wrong. Nowadays, people use a combination of both analog and digital technologies. For all of my digital songs, I used both live and virtual instruments, including the vocalists. I planned that aspect of my production during pre-production. I did not realize that both analog and digital are used in many modern productions. I had been using both

throughout my student career at MTSU, but I did not take notice until I decided to study the subject for my final project.

On “We Can” the vocal signals were routed through the tape machine and analog board at Royal Studios. Outboard compressors were also used to further “deepen” the analog sound. I was showed an example of how engineers today try to incorporate analog warmth into their digital projects. After the vocals were recorded, I found myself trying to fit the other instruments into the sound of the new vocals. The “crispy” and “clean” factors I was used to hearing from recording with all digital equipment disappeared from the vocals. There were two distinct sounds present in my digital production: the analog-like vocals and the digitally recorded instruments. I used a lot of compressor and EQ plug-ins to fit the instrumental into the vocals.

In general, I was able to learn much from my modern, R&B production, and that knowledge aided in the production of my analog project. My 70s production, was partially simplified because I used the digital demos I produced as references for my 70s ensemble. I recorded and mixed the songs at Royal Studios. I also used the same rhythm section for all three songs: “We Can”, “Cruise With Me”, and “Chicken Pox”. Steve Potts performed on drums, Ray Griffin was the bassist, Michael Toles played guitar, and Lester Snell played B3 Organ, Wurlitzer, Rhodes, and piano. For “We Can” the horn section consisted of Lannie McMillan on Tenor saxophone, Jim Spake on Baritone sax, and Scott Thompson playing trumpet. Marcus Scott sung on “We Can” and Stefanie Bolton sung on both “We Can” and “Cruise With Me”. Boo Mitchell was my co-producer and co-engineer.

When I decided to station my project in Memphis, I knew I would have to work with experts in the field. I could not think of a better place to do R&B production, and I did know of a

better place to record my 70s production than one of the original places of the "Memphis Sound", Royal Studios. Boo was able to make better miking decisions and choose better musicians for my project because it something he does nearly everyday. He was very familiar not only with the space, but the musicians as well. Working with him also showed me how it helps to have a team when working in analog. During the recording sessions, I was able to focus more on production while Boo was there co-engineering. When I was concentrating on the engineering, Boo was in-tune with musicians and noticed when things such as horns were out of tune.

In all, I prefer the analog method. What I liked about working with analog is that if your musicians are skilled enough then the production will go faster. Only the singers had listened to the digital demos before hand. The other instrumentalists worked out the song during our sessions, and it did not take long for them to go in the direction I was expecting. As Archie had mentioned, skilled players will correct their own mistakes. During my digital production, I did quite a bit of "coaching" as a producer. They eventually were able to perform the parts as I requested, but it was not always achieved on the first try. After my analog musicians figured out the progression of the song, and I told them the style I wanted, it was done.

Even if I used the same caliber of players for my modern production, as Archie and Boo said, people may not put forward their best effort. I had actually intended to replace April's vocal on "Cruise With Me". I hired a professional singer to sing the part, but it was not executed well. She sung the parts correctly, but the styling of her voice did not fit the production. She was in a hurry to leave, so I took what I received and was disappointed with the results. People sometimes approach digital productions as if you can just record anything and it will work. If it is a serious production, the producer has to be allotted time to mold his or her vision. My singer assumed

because she was a professional singer, that she did everything right. Technically, she did, but stylistically her vocals did not compliment the music.

I also enjoyed the analog process more, because the production process overall can be faster than digital. As mentioned earlier in this analysis, limiting one's self can aid in the creative process. The production may not be as lush as digital one, but the limitations of recording with 24 tracks helps progress the production. There is no going beyond those 24 tracks unless a person wants to bounce down the tracks they have and record more. I was personally satisfied with my production.

As an engineer, I knew how many tracks I had to work with, and I was able to focus on perfecting those. In my digital project, I had close to 40 tracks for some songs, and although modern songs can have more tracks than those, mixing those many tracks still proposed a dilemma. Gaining clarity and distinction between instruments became challenging at times. I had issues with not making the songs sound like large blobs of noise. I had to carve a song out of the mountain of ideas I had experimented with earlier.

In a 70s-like recording, one is more in-tune with the instruments. I knew what everyone was playing, so I could focus in on details and also see the "big picture". With digital, it is easy to focus on all of the details because one can literally record every idea he or she can think of as many times as he or she wants. Once I was ready to mix, I had to sift through the "noodling" and musical distractions in my digital production. While, doing that, I was wearing both the engineer and the producer hat, because I was altering the arrangement in some places to make the song less "crowded". My job became more complex and intense because of all of the editing.

From my experience in analog production, the bulk of the work for the engineer is completed in the beginning of the session. All of the miking, prepping of the machine, and getting the right levels are the hardest parts of engineering in an analog setting. The recording did not take long because all of the musicians were highly-skilled. They knew when recording to tape, there is no room for error. In analog, there is no "I'll fix it later" or "I'll fix it in post" attitude. There is no magical editing software that can bandage musical errors. Everything had to perform correctly during the recording. As said many times before, no musician is perfect, but as long as his or her mistake did not ruin the overall sound, it could pass. As long as the "big picture" stays in focus, occasional mistakes are allowed. Because of the professionalism of the musicians, mixing was not as large of a daunting task as it was in my modern production.

The only part of the mixing process that was strange to me was that I could not "see" the waveforms. There was no computer screen giving me a visual reference for my time location within a song. I honestly felt lost initially behind that big board with no graphics besides level meters (that did not work all of the time). I did not realize prior to my 70s production how much I rely on graphics to help me engineer. Eventually, I was able to adjust and figured that I was to depend upon my ears, not my eyes. One's ear is supposed to be the most reliable source during engineering, but because of DAWs and their visual interfaces, engineers can easily find themselves "looking" more than listening.

Sonically, I prefer listening to the analog songs. There is a distinct difference between the sound of my 70s project and my modern one. I found all of the adjectives used in my resources to be true that describe the sonic quality of analog and digital recordings. I was slightly biased towards analog because that was the sound I grew accustomed to while working at Royal

Studios. All of my digital songs sounded flat and boring to me. As mentioned earlier, I tried to pump life back into the sound of my songs by using processors and effects that would create the warmth I was looking for. I liked the clarity in my digital recordings, but often I found them to be too clear, thus I began trying to "warm up" my tracks. The sound of my analog project is not perfect. I was not used to so much mic bleeding since the majority of my musicians played in small ensembles and it is not as loud as my digital records. Although my digital songs were noticeably louder, they sound rather uneventful since the music's dynamic range does not have much movement. Overall, I liked the warm, fuzziness factor present in my analog songs and the wider dynamic range made the arrangements sound more interesting and authentic.

I established the distinction between the mediums used in 70s and modern production, but more importantly, I needed to distinguish the musical styles of 70s and modern. I knew that the basics of R&B does not change. As said earlier, R&B has its roots in gospel and blues, and those elements always remain in R&B. Part of it is the styling. My formula for R&B is syncopation and minor chord progressions. Once that is determined, all other parts fall in place for me. I know I am not a percussionist or professional drummer, so to help me establish a groove I worked with people who understood drum patterns. For my digital project, Landon produced the drum pattern for "We Can" and Brandon performed the digital drums for "Cruise With Me" and the live drums for "Chicken Pox". For my analog project, Steve Potts was the drummer for all three songs.

I knew to have a "hip-hop" style for the modern production. I knew I needed big drum sounds and big bass. Hi-hats are popular in hip-hop and drums in general. Like Gordon said, people want to incorporate a nostalgic, Memphis essence in their music. My response to that was

to try to develop something more than a simplistic digital production. Working with Brandon made that happen because he is a more experienced musician. He was able to mimic the instruments he was used to playing or hearing. Anything I requested as a producer, he delivered as a musician. I was able to obtain the complexity I was looking for without using mostly live instruments for “Cruise With Me” and “We Can”. In my “Chicken Pox” cover, to distinguish it from the original, I asked for a “funkier” bass and a distorted guitar.

With my 70s production, the music naturally became of the era and Memphis. All of the musicians were originally from Memphis and many of them had played on many original Stax and Hi Records songs. Archie mentioned that the groove was everything to Willie Mitchell. All of the players on my analog sessions knew what to do since they had done it many times before for Willie Mitchell. I asked for the band to speed up the tempo and add a horn section for “We Can”. I knew those two elements would give it a more “old school” vibe. Originally, I had asked Boo if we could use tenor saxophone, trumpet, and trombone for the horn section on “We Can”. He said using baritone was would be more of a “Memphis” sound, and it did make a distinct difference. I also asked for more syncopation from the drummer and more slaps and plucks from the bass on “Cruise With Me”. I also asked Stefanie to sing with a “jazzier” styling. “Chicken Pox” was easy because it was an exact cover.

Producing the music was the most entertaining part of process. I worked with each production from the beginning to the end. It was fun creating different music perspectives on the same songs. I was able to gain a full music production experience because I wore all the hats one can wear in a production. I was a songwriter, a composer, producer, and an engineer. Initially, I

was a performer on several of the early demos, and luckily I was able to work with better performers who could better my songs.

In all, no system is perfect, no production is perfect. I enjoyed both experiences and the challenges that entailed them. Through this experience, I was given the opportunity to collaborate with several amazing individuals, some even legendary. I learned much about engineering, producing, and the studio production process in general. I discovered that freedom is tempting. Because of modern technology, modern music production can take as long as one desires. Having restraints helped coil that urge, such as working with analog systems. There are not as many options in analog recording, so one has to work with what is available. Analog production is tedious. Nothing is instantaneous. There is a lot of waiting and patience involved with equipment, but as Archie said, it is well worth the time, and those are the sentiments I have about my project overall. It took over two years to complete. Through all of the production changes, from musicians to producers and all other personage involved, I eventually accomplished my goals. Finding the groove was not easy, but wait the made the journey more rewarding.

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