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The Gratification Niches of Traditional and Digital Radio

Don G. Shelline

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

Quint Randle, Chair
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School of Communications

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ABSTRACT

The Gratification Niches of Traditional and Digital Radio

Don G. Shelline
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We live in an age where science fiction is quickly becoming science fact. Dick Tracy's 2-way wrist TVs are Apple Watches. Automated smart homes are plentiful. Cars are now able to drive themselves. And in those cars, riders no longer need to depend on a deejay to choose their music for them; these listeners build their own radio stations, on the spot, out of any music and conversation they want to hear, all at the touch of a button that is fully connected to Wi-Fi, the internet, and unlimited cell data plans.

This research will examine digital radio's impact upon traditional radio in the current media environment. It will first take a look at the history of radio, specifically examining radio's reaction and adaptation when a new form of competitive media moved into the mass communication environment, and how radio fared in the face of that competition. The research will then look at uses and gratifications for both traditional and digital radio, which will be analyzed using media niche theory. From this, we will ascertain the niche breadth of each medium, as well as how much overlap exists between the two, and finally, which medium achieves niche superiority over the other in terms of gratifications observed.

Keywords: radio, streaming, on-line radio, podcasting, niche theory, uses and gratifications

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CHAPTER 1 - INTRODUCTION

From its beginnings in the 1920s, radio as a mass communications medium has weathered the incursion of competing technological innovations. Radiotelephony was first employed as a means for naval ships to communicate between themselves. It spread to the general population as manufacturers, looking to sell radio receivers, created land-based “broadcasts” to demonstrate how the medium worked. The public responded strongly in the positive, leading to widespread sales of radio sets. A major “domain” of radio was in the living room. Large radio receivers were purchased and positioned centrally as essential furniture. Additionally, tabletop radio sets found their way into the kitchen, bedroom and workshop.

With the advent of television, radio faced its first threat of being replaced by newer technology. Families had been sitting around the radio, listening to broadcast news, entertainment, and serial dramas and comedies. Now, with TV, they could do that while engaging their eyes and watching the action as well. By the early 1950s, many predicted that television – “radio with pictures” – would simply replace radio. That did not happen. Instead, radio broadcasters and manufacturers looked for and found ways that radio was different, and in fact, superior to television and exploited those differences. In arguing that television engaged both senses – seeing and hearing – proponents of television actually exposed a potential shortcoming of this new medium: it required more focus, and thus limited how and where the audience could use it. Radio programming could be consumed while the listener performed other tasks. So radio became portable.

Radio receiver manufacturers moved the focus from building furniture to building small, portable receivers. With the advent of transistorized circuitry, small pocket-sized transistor

radios gained popularity. Radio receivers were installed in automobiles. Alarm clocks combined with radio sets to wake people up in the morning. Now the listening public could keep listening to news, weather, sports and music while they got ready for work, as they drove to work, at the beach, at the park, wherever they went, they could keep their radio with them.

As radio adapted to the public's busier lifestyle, it also adapted its programming format. Where the living room set focused on serial dramas and comedies, as well as long-form music and variety programming, the advent of portable radio also coincided with the development of shorter-form music programming. As a music-based medium, radio's next potential threat was from car stereos. With the invention of four track, and ultimately eight track tapes in the early 1960s, drivers could listen to their favorite music when they wanted, and in better fidelity than broadcast. By the 1970s, radio responded by migrating music from lower fidelity AM to the higher fidelity stereo FM band.

Next came the 1980s and MTV, where musical acts created short-format videos that accompanied their hit songs. These were aired on a television channel with "VeeJays," or video DJs, patterned after popular radio programming. Again, television threatened to replace radio by adding pictures to radio's already proven and successful format.

Through all of this innovation, radio held on to its unique domain: portability. No other medium worked as well in the automobile. Now, for the first time since radios were put in cars, radio is facing competition on the dashboard. Auto manufacturers are adding more and more interactive audio features as original equipment. GPS systems, weather channels, traffic channels, and the Pandora music channel are all examples of internet-based and satellite-based services that have found their way into the automobile, again threatening to upstage existing radio broadcasters. Parallel to the incursion of alternative media into the automobile is the

introduction of portable media in the telephone – the “Smart” phone. Radio is no longer the most portable medium.

Statement of the Problem

With the rapid change and innovation happening in all web-based and portable media, radio in its traditional form could be in danger of becoming irrelevant. Radio executives and owners need to ascertain what aspects of new media might be helpful to them in keeping radio in the media mix for coming generations. This research sets out to discover specific areas where digital radio is superior to traditional radio, as well as places where they duplicate each other’s services. With clear answers to those questions, station executives can more clearly decide where to put their efforts as they plan for the future of radio. In order to quantify this research, we will employ media niche theory.

The theory of the niche is based upon studies of how animal species in ecological environments interact with each other in regards to scarce resources (Elton, 1927). This can be most useful in analyzing how media entities interact with each other in the face of competition over their own sets of finite resources. To set up this research, this study utilizes theories of media uses and gratifications to ascertain why listeners use traditional radio. Then, using niche theory, the study compares the uses and gratifications of newer, digital radio formats, placing them alongside traditional radio. Niche breadth, niche overlap, and niche superiority are analyzed, to determine whether these two types of radio complement each other, overlap each other, or whether one, through its superiority in meeting users’ needs, is replacing the other.

A convenience sample of 348 undergraduate and graduate students from a large university in the western United States participated in an in-class survey that asked them to rank

on a Likert scale how often digital radio and traditional radio met their needs and gratifications. 32 gratifications statements were listed; in addition, these respondents were asked to respond with their listening habits over the past week. Questions in this section of the survey dealt with listening location, length of time spent listening, and services used. Finally, each respondent was asked basic demographic questions regarding age, gender, education, and hometown.

Results from this research will explicate the reasons listeners choose to use radio, what gratifications it satisfies for them, and whether digital radio is better at meeting those gratifications than traditional radio.

CHAPTER 2 – A BRIEF HISTORY OF RADIO

This chapter will help to set a framework for the research undertaken in this study by first outlining the history of traditional, or terrestrial radio. Then a brief history of digital, or internet-based radio will be discussed.

Traditional (Terrestrial) Radio

There is considerable debate over who truly invented radio. The early electronic foundations of radio began with James Clerk Maxwell, a Scottish mathematician, who came up with what he called “the electromagnetic theory of light” (Rhodes, 1995). This theory posited that light, electric waves, and magnetic waves all travel through ether. Though Maxwell never successfully proved these theories, they did inspire other inventors to continue experimenting with electrical waves.

In 1886, based upon studies of previous scientists, and largely those of Maxwell, German physicist Heinrich Rudolph Hertz theorized that he could create invisible waves of energy between two electrically charged coils. His experiments did indeed uncover the existence of electromagnetic waves, which in turn propagated electromagnetic radiation, leading to what became known as Hertzian waves, the equivalent of what are now called radio waves. (Hertz, 1893). Still, in honor of this discovery, measurement of the cycles of these waves would come to bear the physicist’s name, and, years later, radio stations would be recognized at frequencies in MHz, or megahertz.

Hertz himself saw little intrinsic value in these waves, other than validating the work of previous scientists, notably Maxwell. But many others saw value in harnessing these waves. Users of telegraph communication looked to these newly discovered waves as a medium to

stretch out beyond wires in sending telegrams. As early as 1894, a physician by the name of Oliver Lodge conducted the first public demonstration of wireless telegraphy, sending Morse code signals across a short distance without wires. Simultaneously, French inventor Edouard Branly was refining his work on a radio wave detector, looking for a dependable way to discern and receive these newly discovered radio waves. Branly is on record as the first person to refer to equipment used to generate these electromagnetic waves as a “radioconductor,” thus giving birth to the term “radio” in relation to these wireless communications (Barboutis, 2013). In general, these discoveries addressed the needs and gratifications manifested by a public looking to communicate over distances greater than those accessible by physical wires.

The technological ground broken by Heinrich Hertz laid the foundation for inventors like Nicola Tesla and Guglielmo Marconi to push forward their advances in radio broadcasting. Although Tesla built earlier working models of radio transmitters and receivers, Marconi ultimately took these advances and applied them in a manner that paved the way for viable, useful application of what would become commercial radio (Rhodes, 1995). In fact, because of Marconi’s focused attention on building a working communications model out of this new technology, many consider him to be the “father of radio.” He is credited with bringing many innovations to wireless telegraphy that opened the door to a richer communication experience (Marconi, 1897). First, he introduced modern antenna structures to improve reception of radio waves; second, Marconi accurately predicted that a privatized, monopolistic system of allocation of the available radio wave spectrum would help this young industry to grow; and third, he championed this wireless system as a major means of ship-to-shore and ship-to-ship communication in the field of navigation (Barboutis, 2013). Marconi first demonstrated the power of wireless transatlantic communication in 1901, then proceeded to establish a global

communications company headquartered in Great Britain, setting the stage for future models of radio company corporate structure (Slotten, 2006). The Marconi Company flourished and prospered as it supplied communications links all over the world. It was the Marconi Company that famously kept the world updated on the night the Titanic went down (Magoun, 2001).

Now that wireless telegraphic communication was possible, government and public users of this technology sought a way to communicate the actual spoken word. The first recorded instance of someone using wireless technology to transmit the human voice dates back to 1892 in Murray, Kentucky, by a man named Nathan B. Stubblefield. Stubblefield's experiments consisted of tapping into the conductivity of water and earth using ground wires, as opposed to using actual radio waves, but the ensuing publicity of his ability to transmit the human voice and music wirelessly caught the imagination of the American public and inventors worldwide, who continued working to bring these sounds to radio airwaves (Fawcett, 1902). Although Stubblefield definitely had a flair for showmanship, his business ventures ultimately foundered, and his research remained largely confined to communication from a single sender to a single receiver. In this way, his research was more focused on developing the telephone as a wireless instrument as opposed to broadcast radio. Still, these early experiments opened the door for radio waves to be used to gratify a public's need to be entertained and informed through music, news, sports, and conversation.

Early experiments with propagating radio waves created transmissions that were relatively weak. Scientists next tackled the task of strengthening these signals. In addition to inventors like Edison and Marconi, notable pioneers in this area were Lee de Forest and Edwin Armstrong. In the early 1900s, Lee de Forest invented the Audion, a triode vacuum tube that basically took weak electron signals and amplified them. Due to its similarity to the Diode

vacuum tube patented by the Marconi Company, de Forest's invention was slow to be adopted until lawsuits and patent cases were cleared away. Ultimately though, the Audion tube would open the door to many enhancements throughout the field of electronics, and very directly affected radio transmissions (de Forest, 1904). De Forest continued working with various parts of radio technology, and because of his seminal work in these areas, took credit for the invention of radio broadcasting (Barboutis, 2013).

New York native Edwin Howard Armstrong had analyzed de Forest's work with Audion tubes and by some accounts was acknowledged as understanding their workings better than de Forest himself (Armstrong, 1926). Armstrong soon discovered that by boosting the power in these Audion tubes, they would start to regenerate, creating positive feedback, which greatly increased their output power. Because this regeneration created wave oscillations, these tubes not only received audio signals, but also could transmit them. This effectively moved radio broadcasting from crystal radio and spark generating devices to modern radio receivers and generators and allowed these radio signals to be heard without needing a headset (Armstrong, 1926).

As World War I began, Armstrong enlisted as a signal officer, bringing his knowledge of radio wave communications into the service of his country. Remarkably, Armstrong gave the United States military free use of all of his patents, which contributed to the Allied success in strategic planning of the war efforts. This generous act later came back to haunt Armstrong, as others took credit for his inventions, and years of litigations ensued as he tried to prove his ownership of his patents. During his military service, Armstrong continued his research into creating more powerful radio transmitters and receivers, resulting in the discovery of what he termed the superheterodyne circuit. This technology made radio receivers more selective,

allowing transmissions to be more clearly received and deciphered (Armstrong, 1930). As will later be discussed, this research also led to Armstrong's pioneering work in FM radio.

Now that the transmitted radio signals were stronger, more scientists and hobbyists started experimenting with sending music and words out to "an unknown audience." This really couldn't yet be called broadcasting, because it was still largely signals sent from one sender to one receiver at a time. Barboutis' research into the fusion of technology and communications posits:

It is necessary to wait until the beginning of the second decade of the twentieth century, when the phenomenon of broadcasting starts to proliferate in western societies. Only then does broadcasting begin to acquire steady operation, which increasingly takes a certain form and follows specific practices. The cumulative criteria which characterize the fusion between wireless technology and communication in the form of broadcasting over that period, are as follows: (1) A Hertzian system of communication exists for the diffusion of sound, and offers information and entertainment programmes. (2) The services at issue are used by the broad public (and not simply radio technicians or radio amateurs). (3) They are broadcast on the basis of a regular programme, which is publicized in advance. (Barboutis, 2013)

Right from the start of the history of radio, individual hobbyists and young students were fascinated with this new form of communication, and pursued their experiments with small, localized transmissions of private programs. Many colleges saw individual student start-ups of small radio clubs, which were officially shelved at the beginning of World War I, due to the government's push to focus all communication efforts on the war. This didn't stop the off-air experimentation, and when the war concluded, many colleges were primed to enter into the radio

transmission arena (Slotten, 2006). Notably, many of these hobbyists were taking a different approach than the commercial companies pursuing radio transmissions. Where the companies such as Marconi were focusing on business and military applications of supplying point-to-point exchanges of information, the hobbyists were more interested in creating entertainment programming by playing phonograph recordings and broadcasting them out to anybody that might be listening. These then were the real pioneers in the area of radio *broadcasting*, a field that took its terminology from the agricultural practice of casting broad patterns of seeds into cultivated fields. Universities were a prime area for the cultivation of these early broadcasts, because they were able to offer the academic and technical support to these innovators, without the need to commercialize the endeavors (Slotten, 2006).

Previous to the war, in 1906, a young Russian Jewish immigrant named David Sarnoff had joined the Marconi Wireless Telegraph Company of America as an office boy. At the time, he needed the work to support his family, his father being incapacitated by tuberculosis (Magoun, 2001). At an early age, Sarnoff was fascinated by technology, and soon put that passion to work as he became a telegraph operator for the company. Initially working aboard seal-hunting ships relaying locations of seal herds and communicating between ships, Sarnoff worked his way up to managing the Marconi station atop the Wannamaker's Department Store in downtown New York. Sarnoff has been discredited as overstating his own role in reporting casualties from the sinking of the Titanic, but actual copies of telegrams recovered from that fateful night do show that he was working at the store station, relaying telegrams from operators at the scene (Magoun, 2001).

In 1914, Sarnoff was promoted to contracts manager for Marconi, and in this position, he was able to interface with suppliers and competitors as they explored new products and ideas.

One of these inventors that caught Sarnoff's interest was Edwin Armstrong. Sarnoff was highly impressed with the stronger fidelity and clarity exhibited by Armstrong's receiver. He felt it was clearly superior to the wireless boxes the military were using during World War I. Sarnoff reportedly declared to his superiors that he had found "the radio box of his dreams" (Barboutis, 2013). Sarnoff recognized the immense commercial potential of a wireless radio receiver that could be mass-produced, distributed, and made to receive commercial broadcasts. He lobbied his owners and managers at Marconi to develop a radio system that would cater to a broadcast model. But due to high demand for their point-to-point system, primarily from military orders, built in response to the war, and government mandates following the Titanic disaster, Marconi's managers didn't feel the need to explore systems other than wireless telegraphy, and turned him down.

In the meantime, Lee de Forest, along with other small radio hobbyists, had put together a wireless broadcast presentation of the national election results, originating from the Bronx on November 7, 1916. Sarnoff immediately sent copies of the press coverage of the event to his superiors at Marconi. Again, they did not acknowledge that a broadcast system geared toward the public at large was a sound business idea. Besides, they were heavily involved in negotiations with the General Electric Corporation, who eventually purchased them in 1919 and changed their name to the Radio Corporation of America (Magoun, 2001). With new ownership, Sarnoff had a fresh audience for his pitch toward building a company that would cater to a mass audience, and this time, ownership listened. They allowed him to organize a broadcast of a boxing match between Jack Dempsey and French World War I hero Georges Carpentier on July 2, 1921. Before, during, and after this first ever sports broadcast, Sarnoff worked to market the audience potential of these kinds of events to his corporation, to amateur radio enthusiasts, and to the

general potential listening public. His efforts paid off. Soon, RCA created a prototype consumer radio called the Radiola, and within three years, this consumer-oriented radio receiver had exceeded sales of \$83 million (Carsey & Werner, 1998). This gratified the need to make radio information and entertainment easily accessible to the general public.

Initially, radio broadcasters were often broadcasting on the same frequency, relying upon mutual consent and goodwill to make sure no one infringed upon another's allotted time and frequency. This resulted in very sporadic, fractured program schedules, confusion, and eventual conflict between radio programmers. So by 1920, the U.S. Government began to issue licenses for radio stations. The first official radio license was issued to Pittsburgh, Pennsylvania radio station KDKA. Their inaugural broadcast posted returns of the Harding-Cox presidential election (Rhodes, 1995). Owned by the Westinghouse appliance company, KDKA came into existence primarily as a result of a push by Westinghouse to sell wireless receiving kits through the Joseph Horne Department Store (Arceneaux, 2009). This inaugurated what has continued to be the North American model of commercially-driven radio broadcasting.

In this, the beginning of radio's "Golden Age," the first entities to start up radio stations were newspapers and department stores. As the government was reticent to allow direct advertising on this new form of communication, these companies instead used their station identification and program titling to position their products in a positive light. For example, in 1922, Bamberger's Department Store in Newark, New Jersey launched radio station WOR. At the time, their audience consisted largely of male radio hobbyists. However, because Bamberger's mostly targeted female shoppers, WOR's programming featured traditionally female programming. A local program guide at the time noted:

Concerts, such as are sent by others stations, will be broadcasted. These are to be a minor part of the program however. Lectures on cooking, on house furnishing and decoration, on sewing, on new style trends—all these will appeal to the woman in the home. Besides these features, news of what the women's clubs in Bamberger territory are doing will be spread. (Arceneaux, 2009)

In addition to programming that focused on what the store had to offer shoppers, the actual broadcast facility was usually housed on the top floor, where live concerts were held, all with the intent to attract spectators and potential shoppers to come and see what real live radio broadcasting looked like.

From 1920 to the start of World War II, radio continued to grow and flourish. More and more radio stations were launched, attracting more and more listeners, and commanding more and more advertising dollars. By 1923, there were 510 commercial radio stations in operation in North America, with many more construction permits on the way. In just a year's time, that number more-than doubled to 1105 commercial radio stations by the end of 1924, with sales of radio products totaling over \$400 million (Crawford-Franklin & Robinson, 2013). Early radio programming often consisted of little more than reading headlines and stories from the daily newspaper and playing phonograph records. Yet even from these simple roots, radio broadcasts quickly caught the imagination of the American public, so much so that many record labels initially forbade their artists from performing on radio because of the negative impact on record sales radio was creating. If people could get the music free, why pay for it? From early on, radio proved itself as a medium that could keep people updated on music, events and news on an ongoing basis (Arceneaux, 2009).

As radio's popularity grew, radio station owners realized that consolidating and concentrating their efforts could increase profits and raise the quality of their programming. In addition, if they could create a chain of radio stations from coast to coast, they could attract larger national advertisers and reach a national listening audience (Cox, 2009). These companies began purchasing existing radio operations and applying for new licenses, and consequently national radio networks were born. It started with the National Broadcasting Company in 1926 (Young, 1926), followed by the Columbia Broadcasting System in 1927, the Mutual Broadcasting System in 1934 (which was the only network to not have ownership in any member stations), and the American Broadcasting System in 1945 (formed by an anti-monopoly sell-off of part of NBC) (Cox, 2009).

Because of the national scope of the audience and advertisers on these radio networks, sufficient budget allowed for the hiring of full staffs of engineers, studio orchestras, Foley sound effects teams, and a veritable A-list of the best actors and voice talent in the entertainment business. It is not surprising that, by the early 1940s, more than 80 percent of American homes had radio sets. So it was a logical step, once America entered World War II, that the tremendous influence that was starting to come through the use of the radio airwaves would go to war again as well. Where radio had been largely neutral in respects to the efforts of the allies in fighting fascism, when the Japanese attacked Pearl Harbor in 1941 and Roosevelt took to the radio airwaves to rally the American public, radio became a powerful tool for building support for the war effort (Spiller, 2004).

Going into World War II, things looked bright for the future of radio. But change was in the air. A good example of how radio owners adapted to changes in the media landscape can be found in the story of a radio broadcaster named George Snell. As a small-town Utah native,

George had big dreams of working at one of the major network-level radio stations. By the end of the war in 1945, George had already spent 17 years working in “every job except sales” at one of Salt Lake City’s first radio stations, KDYL (Snell, 1984). From his very first days in radio, Snell had dreamed of working at San Francisco’s KPO, jointly owned by Hale Brothers Department Store and the San Francisco Chronicle. 50,000 watt AM Radio station KPO, first licensed in 1922, had built up its broadcast facilities and programming to a full staff of live musicians and announcers, and it had the distinction of being part of the nation’s first coast-to-coast broadcast as it aired the 1925 inauguration of U.S. President Calvin Coolidge.

George got the job at KPO through his close friend and KDYL co-worker, Floyd Farr, who was currently employed at KPO. When Floyd first gave George the KPO tour, George said he was “amazed at its size and complexity. Floyd told me they had 180 engineers, 20 announcers, 10 producers, staff orchestra, organist, office staff in dozens. He led me through the maze of studios, control rooms, client’s booths, conference rooms, garage, and the Master Control” (Snell, 1984). At KPO, George would go on to write and produce full seasons of regular programs The Standard Hour and The Standard School Broadcast.

While at KPO, George and Floyd hatched the idea of starting their own radio station in neighboring San Jose. The growing city currently only had one radio station, and these young radio entrepreneurs felt it was ripe for a second station. After just two years at KPO, George and Floyd, with the help of a local sponsor and financier George Mardikian, obtained a construction permit from the FCC to build San Jose radio station KEEN. George describes their early attempts at programming KEEN based upon their earlier days at KDYL and KPO:

Lacking a network affiliation (though we kept trying to get Mutual) we tried to emulate network programming which in those days meant a variety of blocks; e.g., woman’s hour,

classical, children's, news, sports, dance remotes, friendly philosopher, etc. This entailed a fairly large staff, and we hired eight announcers, four engineers, four salesmen, three office girls and a variety of casual performers. (Snell, 1984)

Snell's attempt to emulate network radio in a small market soon had the little operation losing money so quickly that drastic measures needed to be taken. Much of the staff was let go, and engineers were called out of the transmitter room to become engineer-announcers, with recorded discs replacing the live studio orchestras and performers. This same practice was beginning to take hold across the country in small and medium locales, and gave birth to the later common practice of shows being hosted by "disc jockeys" (Cooper, 2007). But Snell's ability to be flexible and change in order to adapt to the marketplace allowed him to continue to compete and grow his radio company.

When television became widespread after World War II, it threatened radio's nationwide dominance in network programming and national advertising. As illustrated above, radio responded by becoming more localized, both in programming and in going after local advertising dollars. It also migrated from the living room, where it had dominated as a central piece of furniture around which the family gathered each night for their favorite radio programs, and moved to the automobile, creating an entirely new paradigm for programming and advertising – drive time (Crawford-Franklin & Robinson, 2013). At this time, radio also introduced more portable ways to listen with the invention of the transistor radio, and moved from longer-form entertainment programs to playing specific formats of hit music, moderated by high-spirited announcers.

Whether listening to highly produced, live network programming, or smaller, intimate music shows moderated by disc jockeys, radio listeners found they could depend upon hearing their favorite shows at pre-appointed times. This led to “appointment listening,” or the act of a listener planning ahead to tune in for a specific program. This also prompted cross-promotion, where new programs were advertised during existing popular shows, in an effort to attract more listeners to more shows throughout the daily broadcast schedule. From that point until the present day, traditional radio stations have programmed content that runs in a linear stream, counting upon the audience to find and tune in to specific events, shows and songs, as they are played at specific times. The closest things to interactivity and spontaneity in this broadcast model came from audience phone calls to the station. These ranged from callers requesting songs to twenty-four hour talk show formats where callers weighed in on topics under discussion (Schlenoff, 2012).

Early pioneers in radio were laboring to strengthen and clarify the sounds that were coming from the radio speakers. In the 1930s, radio pioneer Edwin Armstrong had pushed on in his pursuit of stronger, clearer radio transmission and reception. This resulted in his discovery of the superiority of Frequency Modulation (FM) over Amplitude Modulation (AM) in transmitting radio signals. He made the discovery while working for RCA under David Sarnoff. At the time, Sarnoff was not interested in this discovery, having already invested largely in a burgeoning network of AM radio stations, and expanding his empire into the new medium of television (Barboutis, 2013). Armstrong continued his research, creating national headlines with an FM demonstration playing jazz music for commissioners of the FCC. Newspapers as far away as Ogden, Utah were reporting:

If the audience of 50 engineers had shut their eyes they would have believed the jazz band was in the same room. There were no extraneous sounds. (It is) one of the most important radio developments since the first earphone crystal sets were introduced. ("Radio Set-up Eliminates All Noise," 1936)

Despite Sarnoff's opposition, Armstrong moved forward with the development of FM broadcasting, eventually investing in and building up his own regional network of FM stations, called the Yankee Network. RCA successfully lobbied the FCC to allocate the band of FM frequencies currently used by Armstrong's FM stations to instead be allocated for use by the new television industry. At the same time, RCA filed on and acquired the patent rights to FM technology, moves which forced Armstrong to shut down his stations, and which left him nearly penniless. Decades later, after his death, not only would Armstrong's survivors successfully win back his rights to the invention of FM, but Armstrong's invention would eventually win out in the public sphere as well, as FM became the superior mode of receiving high fidelity music on radio airwaves (Armstrong, 1982).

Radio's next major competitive threat came in the 1980's when a new television cable channel combined video with the latest pop chart musical acts, creating Music Television, or MTV. To kick off the newly formed channel, MTV aired a music video by a rock band called The Buggles, titled "Video Killed the Radio Star," in an obvious nod to this channel's intent on unseating radio as the premier place for young people to get their new music (Horn, Downes, & Woolley, 1979).

Radio adapted to these changes in the media ecology by diversifying its formats even further, and also by revitalizing the flagging AM band with nationwide talk radio shows. At the same time, radio industry leaders successfully lobbied for relaxed governmental oversight of

radio ownership, so that single companies could own more radio signals, thus allowing them to capitalize on economies of scale for maintaining profitability in an increasingly competitive media market (Peoples, 2013a).

Traditional radio's strength still lies in its ubiquity and ease of access. Most people just take for granted the fact that when they get in the car, they can turn on the switch, press a button, and a reliable, local, entertaining channel will be coming through the speakers. One of the weaknesses of many terrestrial radio stations is their lack of responsiveness to their audience, brought about in part by the tendency of radio groups to economize by stretching fewer employees over many of their co-owned channels. Traditional radio is also viewed by some as catering to the broadest, lowest common denominator, with very little room for innovation and diversity; additionally, the advantage of being local can be a disadvantage as well, as signals get scratchy, and then fade out completely as one leaves the home market of the particular radio station.

Digital Radio

Initially, the introduction of the Internet and radio on the Internet did not seem to pose much of a threat to traditional radio. Trying to download or stream music on slow, modem-fed personal computers seemed to be too troublesome for it to be very practical for most radio listeners. Since then, however, higher capacity broadband, Wi-Fi, and Bluetooth signals have become commonplace, and cellular telephones and portable tablets are bringing these signals to listeners wherever they are. Now, automobile manufacturers are making Internet connectivity standard equipment in most models of their new cars. For the first time in decades, terrestrial radio will have a viable competitor for the automobile dashboard listening space (Palenchar, 2012).

For the purpose of this study, Internet radio can be defined many ways, and within many parameters, some of which have no real technical connection to radio at all. Not long after the Internet took hold, traditional radio stations began building web sites and connecting their signals to the Internet, creating a streaming form of their regular programming. At the same time, entrepreneurial programmers began building virtual radio stations on the Internet, creating new streaming radio signals. One study actually called into question the reality of these audio streams labeling themselves as radio, in light of the fact that much of the way they were used didn't really closely resemble traditional terrestrial radio programming and delivery (Pham, 2013).

Whether or not they resembled traditional radio stations, these audio streams on the Internet quickly gained listeners, and as a medium grows in popularity, advertising revenues soon follow. Evidence of streaming radio's growing popularity is mirrored in ad revenue growth of 13% in 2013, compared with same-period revenue growth of just 1.5% for traditional radio (Pham, 2013). While revenue for streaming radio is still a small fraction of overall radio ad revenue, the trends are strong for digital radio's revenue growth (Kaye & Johnson, 2003).

From its early roots, radio has been the medium of choice for introducing music listeners to new songs and artists. Because of its linear, push-outward quality, radio has had a unique ability to showcase music that wasn't necessarily what the audience was seeking, but that had a chance of gaining in popularity within a general style of musical format. Usually, listeners came to appreciate and value the judgment of the station management, and specifically the individual disc jockeys, in helping them discover new music. However, even this area is starting to change on the internet (Peoples, 2013b). A big reason for this change is the increasing desire of audiences to have ultimate say in what music they listen to and when they listen to it. Traditional radio companies like Clear Channel, now re-named iHeart Radio, have begun to embrace the

ability of the internet and social media in soliciting what people want to hear and are using that technology in making programming decisions on their terrestrial radio stations (Freire, 2007).

One of the early promises of digital radio was that, in addition to playing your favorite songs, you could also get much more information, and through the internet's inherent ability to be interactive, you could tap into all sorts of interactive features. However, in a 2013 study of web radio users in Germany, researchers found that web listeners focus mostly on music, with relatively little attention paid to interactive features of the web radio site (Stark & Weichselbaum, 2013). But that doesn't change the fact that growing numbers of listeners, especially in the younger demographics, choose digital radio over traditional radio to get their music and entertainment (Edison, 2015a).

From the early days of news groups and chat rooms on the Internet, studies have been conducted to assess the impact that the Internet as a news source has on traditional newsgathering media, i.e., newspapers, radio, magazines and television. One such study found that, early on, increasing use of the Internet did not seem to alter overall usage of traditional media sources. However, the same research revealed that, in the mid 1990's, heavy searchers for political news moved those searches from television news to the Internet. Similar research a decade later showed radio news and news magazines suffered more loss of audience to the internet, again among political news audiences (Swanson, 2012).

On the technology side, some of the greatest growth in Internet audio usage has occurred in the field of portable tablets and smartphones. In fact, research shows that the size of a tablet's screen is strongly related to the uses that a consumer will apply to that tablet. Users of tablets with screens seven inches or larger are more prone to downloading apps and using the tablets to produce, download, and participate in more immersive types of media experiences. Those with

smaller tablet screens tend to use them for simpler tasks, which still include simple audio and video streaming. Projected tablet distribution figures indicate that by 2016, 65% of tablets purchased will be in the 9 to 11-inch size. And the same research projects that the smaller tablets will continue to decline in sales (Moscaritolo, 2012). This will open up future questions about how audio and video streaming will integrate into a larger screen technology.

Internet-based digital radio, in its many forms, continues to grow in popularity. An industry gathering of chief executives from major music corporations showed widespread agreement that the future looks bright for streaming audio on the internet and various portable devices (Sundar & Limperos, 2013). A look at the current state of digital radio is positive, with healthy growth evident in many areas ("IAB 2013 Annual Report," 2014).

According to Edison Research, on-line digital radio currently reaches a monthly audience of 143 million users, which represents 53% of the population of the United States, age 12 and older (Edison, 2015b). This research also found that 44% of the U.S. population 12 and older listens to on-line radio weekly. These figures represent double-digit growth in digital radio listenership over recent years. The latest Edison Research continued to shed more light on trends in digital radio: 44% of Americans 12 and older turn to the internet first to learn about new music, as opposed to 39% turning to traditional radio to discover new music; smart phones are the preferred device for listening to digital radio (73%) with computer-based listening dropping down to 61%; 35% of these on-line listeners tap into the digital signal in their car, with that number jumping up to 59% of listeners age 12-24 (Edison, 2015b). Looking at the increases in digital radio listenership, the Radio Advertising Bureau summed it up this way:

Although it's all sound, consumers and the respective industry segments differentiate among traditional AM/FM radio, digital audio/Internet radio services, and satellite radio

services. The newer audio options have established a place in the media spectrum relatively quickly, appealing to younger consumers, early adapters, upscale adults – and advertisers, who are attracted to the expanded options afforded by satellite and digital/online audio marketing. (Bureau, 2016)

Edison Research looked at specifically where digital listeners are getting their music. Asking listeners where they tuned in during the previous month, they found the top ranked services were Pandora at 34%, iHeart Radio and iTunes Radio both at 11%, and Spotify at 10%. These numbers all represent growth over last year's reported listening. Also noted in the research is the fact that 52% of the population 12+ tuned in to video channel YouTube to access music videos. An interesting side-note was that 73% of these respondents said that they listened to YouTube without watching the videos at least some of the time, with 34% saying they listened without watching most of the time. This could suggest that, although YouTube carries audio and video, it could still be a contender in the digital radio category (Edison, 2015b).

Podcasting is one area that has been around for years, but continues to gain in strength. In just six years, from 2006 to 2015, Americans using podcasts grew from 11 percent to 33 percent. Currently, podcast listeners in the United States age 12 and older number over 89 million (Edison, 2015b). And the top podcasters are now earning millions of dollars annually in advertising and subscriptions (Matthews, 2013). However, research done on college-aged students shows that, while a high level of respondents report downloading podcasts, most college-aged listeners don't actually listen to podcasts more than one hour per month, and less than half of the study's respondents listen to all the podcasts that they download (Sexton, 2012). Still, all areas of this form of audio usage appear to be in a healthy growth mode (Edison, 2015b).

New media seems to bring with it many apparent advantages over traditional radio. There is a virtually endless supply of music – whatever song or genre a listener may desire can be found somewhere on the Internet. Suppliers like Pandora and Spotify continue to make it easier to find this music and to play it with customized personal playlists and players. Subscription-based music services have overshadowed the older model of music ownership. Why buy music when you can just subscribe to a library that has all the music you could want? These custom-made radio stations have also migrated from the desktop computer, to where they are now easily accessible via cell phones and portable tablets and pads. In many ways, this migration to handheld devices is reminiscent of the migration of radio to portable transistor radios in the 1950s and 1960s (Lin, 2009).

The only frontier that seemed inaccessible to these new radio stations was the automobile – still a stronghold for traditional radio. Now, with continued improvement in internet signal coverage and strength, and with automobile manufacturers including internet radio connectivity in most new cars, this last bastion of traditional radio seems to be falling (Palenchar, 2012).

For the time being, new media still suffers from frequent signal dropout, buffering, and sporadic connectivity issues. And even with the capability of cars to access the digital Internet radio stations, it still is a rather complicated process to tune the stations in. In light of this, rising concern over distracted driving and possible legislation to address that issue is a major concern to the rapid growth of Internet radio on the highways. But music programmers and the automotive industry are working together to overcome those obstacles as quickly as possible (Goldstein, 2016).

CHAPTER 3 – LITERATURE REVIEW

This chapter will introduce the theoretical concepts of uses and gratifications, and the theory of the niche in media. It will then outline details of the specific niche theory equations. Ultimately, this will lead to the research questions that this study will seek to answer. The scope and purpose of this research is to explore differences and similarities between traditional radio, and newer digital radio. The specific areas used for comparison are based in uses and gratifications theory, and in niche media theory. Research questions posed will explore media generalization, overlap, superiority, and unique and shared gratifications.

Uses and Gratifications

Uses and gratifications first came into communications research as an alternative to early World War II era “hypodermic needle” propaganda theories, which posited that ideas and influences could be injected by the mass media into the public (Spiller, 2004). Uses and gratifications theories, instead, proposed that the consuming public actually have a choice in what media they use, how they use it, and with what effect (Papacharissi, 2009). At the time, researcher Harold Lasswell identified three basic uses for mass media: “surveillance of the environment, correlation of events, and transmission of social heritage”(Lasswell, 1948). Other applications of uses and gratifications theories in the field of communications held that certain kinds of gratifications will hold the attention of a given media user, driving them toward certain types of media; this research also theorized that various types of content and media would fill specific needs in a person’s life (Ruggiero, 2000).

Even before uses and gratifications came into being as a research tool, scientists in the 1930s were studying audiences' motives and selection patterns in choosing to listen to radio. So radio should have been right in the middle of the nascent uses and gratifications research that came into being in the 1940s. Unfortunately for radio, a new exciting medium had just begun to sweep the imagination of the media consuming public – television. So much of the initial uses and gratifications research focused on this newer medium (Papacharissi, 2009). However, as radio adapted to the changing media environment, more uses and gratifications studies emerged, focused on radio on its own, or grouping radio in with other mass media.

In 1974, a group of researchers defined the theoretical foundation of uses and gratifications as:

The (1) social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources, which lead to (5) differential patterns of media exposure (or engagement in other activities), resulting in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones. (Katz, Blumler, & Gurevitch, 1974)

As more research was conducted on radio uses and gratifications, more gratifications were brought forward. In the 1960s, factors like entertainment were added as a reason people use radio. Specifically, research found listeners looked to radio for companionship, to fill a void created by daily routine, altering moods, relieving boredom, providing news and information, allowing active participation in events, and overcoming social isolation (Mendelsohn, 1964). In the 1970s, further research added gratifications met by broadcast radio: “To match one’s wits against others, to get information and advice for daily living, to provide a framework for one’s day, to prepare oneself culturally for the demands of upward mobility, or to be reassured about

the dignity and usefulness of one's role" (Katz et al., 1974). In the 1980s, a Canadian study found that radio satisfied gratifications in the areas of music, companionship, and general information content (Houghton-Larsen, 1982). Killing time was added as a more passive gratification sought from radio (Lichtenstein & Rosenfeld, 1983). In a study focused on the helpfulness of radio news, researchers uncovered the gratifications of surveillance / interaction with the user's surroundings and diversion from the environment (W. Towers, 1985). A few years later, another study by Towers added the radio gratifications of entertainment, immediate news, localness of news, and the ritualistic nature of listening (W. M. Towers, 1987). Along the way, new terms to describe overall radio gratifications were put forward. For example, Williams, et al., introduced Demassification as the power that individuals were starting to have over a given medium, and Asynchronicity as the concept that messages or programs may be staggered in time (Williams, Rice, & Rogers, 1988).

As radio matures and evolves, and radio audiences and tastes change, uses and gratifications change as well. More recent studies show that people listen to radio because it gives a variety of listening choices, it helps pass the time, they get greater control over the listening experience, it helps them relax, it provides music and entertainment at convenient times, it helps them forget about daily chores, it gives them access to news and information, it gives a number of different entertainment choices, it helps occupy time, and it gives the best value for the money (A. Albarran et al., 2007).

While much research has been done on uses and gratifications of web media, a fair amount of refinement is still in order. In research from 2013, Sundar and Limperos explored ways to refine further standard uses and gratifications dimensions, with an eye toward narrowing

down some dimensions to more closely address the gratifications received and uses employed in newer media (Chung & Kim, 2009).

A 2003 study looking at traditional and web magazine usage showed gratifications for magazine usage: surveillance, keeping informed, self-actualization, communication, interaction, to combat boredom, diversion, by being readily accessible, and gratification opportunities (Randle, 2003). Looking to discover gratifications opportunities for users of podcasts, Chung and Kim found possible gratifications in seeking information on a concrete problem, because it's a habit, convenience, entertainment, arousal, education, information, relaxation, pastime, escape, social interaction, voyeurism, and companionship (Chung & Kim, 2009).

Another study on uses and gratifications that college students received from downloading and listening to podcasts found that students have six basic motivations for listening to podcasts: 1) voyeurism, which includes social interaction and companionship; 2) entertainment, encompassing relaxation and arousal; 3) education/information; 4) pastime and escape; 5) habit; and 6) convenience (J. Dimmick, Feaster, & Hoplamazian, 2011).

Specific to digital radio, a group of researchers set out to study on-line radio listenership among younger users, subsequently finding gratifications that include acquiring information, alleviating boredom, setting a mood, passing the time, and as a remedy for loneliness. This study also found that music on the radio can be used for background music, to set a soundtrack for activities, and as a source for discovering music and artists. Some interactive uses for radio could include choosing the music that plays, expressing individual taste via playlists, sharing those playlists, and learning more about music and talked-about topics (A. Albarran et al., 2007).

Another study on teenage radio listeners found that they seek radio gratifications of entertainment, escape, social utility, habit / pass the time, and information seeking (McClung,

Pompper, & Kinnally, 2007). From a study on web radio and traditional radio in Germany, the authors found a number of gratifications for listening to radio. These are: to gain information, because it provides news, to inform oneself about current affairs, for relaxing, because there is already a habit for listening, using it to forget about school and work, avoiding loneliness, personalization, music, station variety, station signal quality, interactivity, having fun, and entertainment (Stark & Weichselbaum, 2013).

General media gratifications dimensions that were chosen to be used in this research centered around Information Seeking, Passive Mood Setting, Social Utility, and Self-actualization. Two more factors surfaced: Music, and Interactivity, but ultimately were not used because of lack of enough supporting data. All of the dimensions used are valid areas of radio gratifications, based upon previous research.

One of the challenges encountered in studying radio is defining radio. The history of radio cited earlier in this paper demonstrates the adaptability and changing faces radio has exhibited in the past. Now, as radio ventures into cyberspace, many new forms of what could be called radio are emerging. Stark and Weichselbaum group what they call Web Radio into five categories: simulcasts (streaming traditional radio stations on the web); on-line sub brands (web-only radio provided by traditional stations); user-generated radio; on-line only stations; and aggregators (Pandora, for example) (Stark & Weichselbaum, 2013). For the sake of this research, we have defined the two categories of radio as follows: *Traditional Radio*, which includes music, news, talk and sports programs that are on the FM and AM channels in a person's car and on home radio sets, as well as satellite radio; and *Digital Radio*, which includes talk and music programs that are on a computer, tablet or phone. This is programming that can be streamed or

listened-to on-demand. For the sake of the study, Digital Radio does not include just downloading songs (from iTunes, for example) and playing them on a portable player.

Comparing traditional radio and digital web radio shows a high degree of similarity in many of the basic gratifications studied in the past. At the conclusion of this research, we hope to ascertain similarities and differences in gratifications obtained from each of these types of radio platforms.

Niche Theory

Niche Theory is built upon the theory of ecologies of systems in animal and plant species. It posits that, when a new species enters into a relatively stable existing ecosystem, the new species will have an effect on the existing species/system. Studies of niches in biology date back to Darwin and his explanations of species struggling for existence (Pocheville, 2015). In 1927, British ecologist Charles Sutherland Elton defined the concept of the ecological niche more succinctly, narrowing it down specifically to animals, and their place in their environment, primarily in terms of food and enemies (Elton, 1927). Elton's studies shed more light on the ways that a species responds to resources in its environment, and also how it impacts those resources. He found that the more similar species are to each other, the more they compete for scarce resources. Conversely, the more diverse they are, the better they can coexist. Some of the ways the various species respond to the environment and to each other are by adapting, competing, replacing, or conceding to the dominant species. An important part of this theory is its basis in competition for scarce resources by the new versus the existing species (Pocheville, 2015).

In 1957, zoologist G. Evelyn Hutchinson introduced the concepts of niche breadth and niche overlap to the ongoing study of ecological niches. Niche breadth defines the variety of resources used by a given species, and niche overlap simply refers to the overlap, or commonality, of resources used by various species (Hutchinson, 1957). Next, researchers built upon the quantitative roots of Hutchinson's niche theories by incorporating statistical models around the breadth, overlap, and superiority concepts. This allowed more clinical approaches to what had so far been a rather theoretical approach to the concept of ecological niches (Pocheville, 2015).

In 1984, researchers Dimmick and Rothenbuhler explored ways to apply niche ecological theory in a non-biological model: mass media. Their research looked at the ecological model of the pursuit of scarce resources, such as food and water, and applied that to the way media companies must pursue the scarce resources of advertising revenues and audiences. In this initial study, Dimmick and Rothenbuhler contemplated the possible impact that the (then) new cable industry would have on existing television networks. To set the stage for the study, they calculated the niche breadth and niche overlap of four media industries: newspaper, television, radio, and outdoor advertising. Among their findings, and cogent to this research, was:

The most dramatic single event in the time series was television's effect on the radio industry, which can now be understood as an illustration of the principle discussed earlier as competitive displacement or exclusion. As TV invaded the community, the two industries exhibited the highest overlap recorded in the entire time series. As a result of competition from TV, radio's niche breadth dropped precipitously, reflecting television's displacement of radio from the national component of its niche and its concomitant specialization on local advertising. (J. W. Dimmick & Rothenbuhler, 1984)

The researchers do go on to say that radio survived and actually thrived this post-television environment by adapting and focusing on the aforementioned local advertising. One of the specific reasons cited for radio's ability to bounce back was that it had a high niche breadth previous to television's arrival, which allowed it to choose compensating alternatives when television took away some of its resources (J. W. Dimmick & Rothenbuhler, 1984).

Regarding the juxtaposition of media studies on ecological models, the authors felt that the value and validity of niche theory and its use in analyzing other non-biological groups and societies lay in its ability to be literally applied. It is not simply analogous or symbolic. In the case of competing media, for example, one medium truly does compete against another for scarce resources like advertising revenues. In conducting the research, they defined an organizational "population" as "a set of organizations composed, for example, of television stations or newspapers and corresponding roughly to a medium or communication industry" (J. W. Dimmick & Rothenbuhler, 1984).

Then, in 1993, Dimmick and other researchers explored a deeper, if somewhat less concrete approach to niches in mass media: the satisfaction of gratifications. Dimmick felt that, in order to be able to build up audience size and revenues, mass media companies need to first satisfy the expected and obtained gratifications, or, as he states, gratification utilities, that audiences seek in their lives, and that the medium that could be classified as superior in achieving this would be the medium that ultimately survives and thrives (A. B. Albarran & Dimmick, 1993).

Between these two approaches to niche theory in mass media communications, many subsequent studies, by Dimmick and other researchers, have been conducted. A common theme is looking at the invasion of an existing media environment by a new form of similar media. One

example of how niche theory can explain the adaptation, displacement or complementation brought on by a new medium comes through research conducted on individuals' usage of mobile media to access news and other content. Dimmick and his colleagues found that users did not diminish their usage of traditional media to access this content. Instead, they augmented it by accessing the new media news content in the interstices, or gaps, left by traditional media (J. Dimmick et al., 2011).

Over time, niche theory research has been applied to a broad spectrum of new and existing media: e-mail and the telephone; the internet and traditional news media; the internet and television; hard-copy magazines and web-based magazines; and instant messaging in relation to e-mail and telephones, just to name a representative cross-section. One area in niche-based theory that has been neglected is the study of the impact of internet based digital radio compared with existing traditional terrestrial radio. This research will examine specifically the niche breadth of traditional and digital radio, the niche overlap of the two media, and whether or not digital radio is ultimately superior to traditional radio.

Before we look at the mathematics behind niche theory, it might be useful to apply the elements of this theory to our objects of study: traditional and digital radio. An example of radio with high niche breadth would be a medium that keeps listeners entertained, it provides a broad range of information, it is convenient to receive, it plays the listener's favorite music, it alleviates boredom, and it helps a person feel better for listening. A radio service with narrow breadth would just be good at one or two areas of gratifications. If overlap between digital and traditional radio were high, both media would be equally adept at providing good music, entertaining announcers, and companionship, and they would both help you have a better life for having listened to them. Low overlap between traditional and digital radio would exist if, for example,

traditional radio was exclusively good at bringing the listener the latest sports, and digital radio was the best for introducing new music to listeners. And superiority between digital and traditional radio would simply show which medium gratifies the needs of listeners better in the given dimensions.

Specifics of Niche Theory Formulae and Definitions

In order to quantifiably measure niche gratifications between traditional radio and digital radio, this study makes use of three niche calculation formulae, originally modified from the ecological formulae by Dimmick et al in their previous media research (J. Dimmick, Kline, & Stafford, 2000). First of these is the measure of Niche Breadth, which measures the degree to which a medium can satisfy a relatively broad or narrow spectrum of statements on a gratification dimension (J. Dimmick et al., 2000). Basically, the broader a medium’s niche, the more generalized it is and the more gratifications it can meet. The formula is stated as follows:

Niche Breadth

$$B = \sum_{n=1}^N \left[\frac{\left(\sum_{k=1}^K GO_n \right) - Kl}{K(u-l)} \right]$$

Where:

u, l = the upper and lower bounds of a scale (5 and 1)

GO = a gratification obtained rating on a scale

N = the number of respondents using a medium

n = the first respondent

K = the number of scales on a dimension

k = the first gratification scale

So if a greater number of people listening to one of the types of radio studied have a greater number of different gratifications met, in higher satisfaction levels, that medium will have a high niche breadth. If one of these types of radio has a higher niche breadth than the other, across the various gratifications, that medium has a better chance of survival.

The next formula is Niche Overlap, which is written as an inverse measure, meaning that a low overlap score indicates a high similarity in gratifications obtained from the two media, where a high overlap score indicates overall dissimilarity between the two media. According to Dimmick et al, high overlap would show the two media may be substitutes for each other, whereas low overlap would indicate a state of complementarity; that is, the two media can exist comfortably side-by-side (J. Dimmick et al., 2000). The formula for niche overlap is as follows:

Niche Overlap

$$O_{i,j} = \frac{\sum_{n=1}^N \sqrt{\frac{(GO_i - GO_j)^2}{K}}}{N}$$

Where:

i, j = medium i and medium j

GO = a gratification obtained rating on a scale for i and j

N = the number of respondents who use both i and j

n = the first respondent

So, if digital radio and traditional radio exhibit a high overlap score across the gratifications, the two are essentially duplicates, meaning that one of them doesn't need to be there anymore. When this is the case, niche superiority will indicate which medium will remain.

Finally, this research uses a formula for Niche Superiority. Competitive superiority is a measure of whether one of two media measured is better than the other at meeting gratifications. If the scores are close, neither medium will emerge as superior in gratifications met. Here is the formula for niche superiority:

Niche Superiority

$$\text{Superiority } S_{i>j} = \frac{\sum_{n=1}^N \sum_{k=1}^K (m_{i>j})}{N}$$

$$\text{Superiority } S_{j>i} = \frac{\sum_{n=1}^N \sum_{k=1}^K (m_{j>i})}{N}$$

Where:

i, j = medium i and j

$m_{i>j}$ = the value of a respondent's rating for those scale items on which i is rated greater than j (the sum of the actual values)

$m_{j>i}$ = the value of a respondent's rating for those scale items on which j is rated greater than i (the sum of the actual values)

K = the number of scales on a dimension

k = the first gratification scale

N = the number of respondents who use both i and j

n = the first respondent

This research seeks to ascertain the place of newer digital forms of radio in the existing ecology of traditional terrestrial radio. Niche theory states that, for a new medium to replace an

older one, both overlap and superiority must be satisfied. Essentially, the new medium must gratify the same needs as the old one, and it must be clearly superior in meeting those needs.

Research Questions

After completing the research and assessing the respective uses and gratifications of traditional radio and new digital internet-based media, this study should be able to answer four research questions. The first three research questions deal with niche breadth, overlap, and superiority, in order to demonstrate levels of competition, complementarity, similarity, and replacement:

RQ 1: Based upon niche breadth, is digital radio more generalized or specialized than traditional radio?

RQ 2: Where do digital radio and traditional radio overlap?

RQ 3: Where does digital radio demonstrate superiority over traditional radio? Where is traditional radio superior over digital radio?

The fourth research question takes a deeper look at radio gratifications, and analyzes where traditional radio and digital radio cross over with shared capabilities to meet gratifications, and what gratifications are unique to each medium:

RQ 4: What gratifications are unique to digital radio, and what are shared with traditional radio? Are there similarities in gratification dimensions?

CHAPTER 4 - METHODS

This study seeks to understand gratifications obtained by users of traditional radio versus users of digital internet radio, and then apply those comparative uses and gratifications to the overall ecological environment of radio usage. As reviewed above, when a new medium enters an existing media environment, it consumes scarce resources. In this case, the new medium, digital radio, impacts the resources of traditional radio. For this study, the impacted resources under observation are gratifications obtained from traditional and digital radio. By studying the gratifications obtained by users of each of these media, we hope to come to a better understanding of the level of breadth, overlap, and superiority that this new medium, digital radio, exhibits.

Variables Used in the Analysis

The research questions in this study were addressed by collecting ratings on uses and gratifications statements specific to radio usage. These statements were subjected to an exploratory factor analysis, which in turn was used to generate a series of scales that suggested four major factors shared by users of traditional radio and digital radio: Information Seeking, Passive Mood Setting, Social Utility, and Self-Actualization. These factors mirror those found in a number of previous studies of radio uses and gratifications (A. Albarran et al., 2007; McClung et al., 2007; Stark & Weichselbaum, 2013). In the German study by Stark and Weichselbaum, the researchers created a two-pronged assessment that featured the gratifications of music and station variety and signal for traditional, terrestrial radio; then it featured the gratifications of interactivity, information, and personalization as dimensions more closely tied to digital internet radio. Because web radio continues to change and evolve rapidly, some slight modifications

were made to the factors in this study to create a better fit. Likert Scale ratings for the gratifications statements in each of these factors were then applied to niche theory equations specific to niche breadth, overlap, and superiority measures.

Following is a brief explanation of each of the individual niche variables used in this research. These are based upon Dimmick's research of niche theory and media (J. W. Dimmick & Rothenbuhler, 1984). *Niche breadth* is a measure of how specialized or generalized a particular medium is perceived to be. The higher the breadth score, the more generalized the medium is. A lower breadth score indicates a more specialized medium. *Niche overlap* measures the similarity or difference between two media, and the resultant amount of competition between one or more media in a market of finite resources. For example, if two media in a resource-limited environment compete for the same resources, the stronger medium may drive out or eliminate the other medium. Generally, an overlap score of 1.31 or less indicates a higher level of competition, while a larger score indicates the media are more unique and less prone to overlap. (J. W. Dimmick & Rothenbuhler, 1984). *Niche superiority* indicates the level at which one medium is perceived to be more effective at meeting certain gratifications over another medium.

Sample Size and Characteristics

A self-report questionnaire was distributed via in-class administration to 348 undergraduates in Communications classes at a large Western university. This sample base fell mostly within the desired target age demographic of 18-34 years old. This is a desirable demographic because it represents current and future users and potential users of all forms of radio, and data gathered from this sample demographic group could reflect possible media usage habits and patterns on the broader population of this type of user. Because of its long history,

traditional radio is sometimes seen as an old medium catering to an older demographic, so there is a need to understand what is driving younger people towards or away from radio listenership.

Of the total respondents, 38% (N=132) were male, while 60% (N=208) were female. The 2% discrepancy is due to a total of 8 respondents not completing the gender portion of the questionnaire. The average age of survey respondents was 21 years old. The probable cause of a younger-skewing age is that these surveys were all conducted in beginning level communications courses. Of the 348 respondents, 71% (N=247) reported using traditional radio in the past week, while 89% (N=308) reported using digital radio. Of all respondents, 63% (N=218) reported using both traditional and digital radio in the preceding week. The relatively high usage of traditional radio (71%) by a younger audience of “digital-natives” may seem surprising, but possibly points to the ubiquitous nature of background sources of audio from traditional media. Also surprising is the relatively high percentage (63%) of respondents using both digital and traditional radio. This might suggest that there is room for both types of radio to coexist in satisfying radio gratifications.

The listening habits of this sample were heavily skewed toward usage of digital radio. Of all respondents listening to traditional radio, the average time listened was 27 minutes per day; digital users reported listening an average of 96 minutes per day. That is more than three times the time spent listening to traditional radio. Looking at those who used either type of radio more than average, 31% (N=76) of listeners to traditional radio listened more than the average 27 minutes per day. Of these heavy traditional listeners, 38% (N=29) were male, and 60% (N=45) were female. Of the 39% (N=120) of digital radio users who listened more than the average 96 minutes per day, 33% (N=39) were male and 64% (N=77) were female. Again, the discrepancies

in totals are due to respondents not designating gender on the survey form. Greater than average digital listeners, who also are greater than average traditional radio listeners was 10% (N=32).

Of those who reported using some form of digital radio in the past week, 65% listened to Spotify, 49% listened to Pandora, 19% listened to iTunes, 15% to podcasts, 8% to You Tube, and 12% used a variety of other digital audio options. The total is over 100% because most users reported using multiple services. 85% (N=209) of those who listened to traditional radio reported they listened in the car. All other locations for traditional listening were reported at much lower levels.

Methodology

Because niche studies require comparative data gathered from two competing mediums, the goal is to capture data from a group of respondents who use both traditional and digital radio. For the purposes of the survey, and to help respondents understand the difference in radio media, traditional radio was defined as radio that is on the AM and FM band in cars and on home radio sets. It also included satellite radio. Digital radio was defined as any streaming or on-demand audio received via internet connections on computers, as well as on smart phones and portable tablets.

Data was gathered from each respondent revealing listening locations, time spent listening, age, gender, education and home state. The survey then asked respondents to rank on a 5 point Likert Scale the gratifications received from both traditional radio and internet radio, with “1 = never” to “5 = all the time”. Thirty-two gratifications or uses were created from previous studies on gratifications obtained from traditional radio (Katz et al., 1974), as well as those obtained from digital media (Pham, 2013; Stark & Weichselbaum, 2013; Sundar &

Limperos, 2013). Additional gratification statements were added to the survey based upon a pre-survey pilot questionnaire. Important to remember in this sort of analysis is that the administration of a questionnaire on uses and gratifications was not to explain uses of radio, but instead to provide a comparison framework for niche calculations relative to traditional and digital radio.

Measures

The 32 survey statements in the research were submitted for both media to an exploratory factor analysis, with varimax rotation, to find correlations and variances. Previous gratifications studies (Dimmick et al., 2000) show that a factor loading of at least .30 was required for a statement to be considered part of a factor (Gorsuch, 1990). The initial run of the default analysis yielded 32 factors, but only six had Eigenvalues greater than 1. An Eigenvalue of 1 is also a traditional cutoff point for dimensions in factor analysis.

The purpose of this research is to compare the gratifications across two separate media (traditional radio and digital radio). The final factors need to do two things: first, load to a unique dimension for each individual medium, and then, load to parallel dimensions with the same statements loading on the other medium. Otherwise, valid comparisons could not be possible.

Seventeen of the original statements loaded to one medium with an equivalent factor for the other medium. Creating the scales for these two media proved difficult for a number of reasons: first, there were some statements that loaded in the factor analysis for one medium, but not for the other medium. Second, despite having six factors with Eigen values of 1 or above, two of those factors were weak, with low factor scores and high duplication across the other factors, so the two factors were dropped, leaving a total of four final dimensions.

To address the issue of balancing between cleanly loaded factors and building scales for niche measurement, this solution was reached: If a statement loaded cleanly on one medium, but loaded to multiple factors on the other medium, it was included in the factor if it increased the alpha reliability of the scale on the medium where it had not loaded cleanly (where it had loaded to more than one factor). Otherwise, it was excluded from the analysis. For example, the statement, “to alleviate boredom,” in factor analysis as a traditional radio statement loaded cleanly to one factor, but loaded to two factors as a digital radio statement. However, including it in the traditional and digital factors increased the alpha reliability for each of them from .89 to .90. Using this procedure, ten statements did not load cleanly or increase the alpha reliability of their factor scale. A further discussion of possible reasons why these statements did not load cleanly will be discussed in the next section of this paper. These deleted statements are listed in Table 5 below.

Twenty-two of the 32 survey statements were used in four factor scales for both mediums. The factor loadings, Eigenvalues and alpha reliabilities of the resulting dimensions are presented in Tables 1-4. All of the alpha reliability scores were above .60, ranging from .68 to .85. An asterisk denotes statements that loaded to more than one factor, but were included in these scales because they increased reliability.

The difficulty in loading clean factors across the two media might point to possible struggles for users of radio in discerning differences between digital and traditional radio; it also could indicate opposite tendencies, where listeners may use each medium in strikingly different ways to satisfy the same gratifications. Thus the need to force the statements to both load internally, as well as load conceptually across the two media. But because this action did

increase alpha reliability, it was deemed acceptable for including the weaker loading statements in the niche calculations.

Table 1 - Dimension: Information Seeking

Factor loadings for traditional and digital radio gratifications

I listen to radio...	Traditional	Digital
To acquire information	.802	.769
To learn something new	.729	.799
To express my political views	.681	.643
To follow my favorite sports teams	.576	.472
To acquire trivia	.627*	.391*
Eigenvalue	1.98	1.38
Variance explained	.09	.07
Alpha	.74	.72

Table 2 - Dimension: Passive Mood Setting

Factor loadings for traditional and digital radio gratifications

I listen to radio...	Traditional	Digital
To pass the time	.732	.486*
As a remedy for loneliness	.475*	.730*
To energize me	.643*	.301*
To alleviate boredom	.777	.454*
Eigenvalue	11.15	2.66
Variance explained	.21	.09
Alpha	.83	.81

Table 3 - Dimension: Social Utility

Factor loadings for traditional and digital radio gratifications

<u>I listen to radio...</u>	<u>Traditional</u>	<u>Digital</u>
Because it's sociable	.730	.654*
Because others are doing it	.784	.730
For companionship	.262*	.175*
Because it's live	.222*	.291*
To express my taste in music	.132*	.211*
Because I can interact with the station	.240*	.472*
Eigenvalue	1.14	1.28
Variance explained	.05	.06
Alpha	.70	.68

Table 4 - Dimension: Self-actualization

Factor loadings for traditional and digital radio gratifications

I listen to radio...	Traditional	Digital
Because I can choose music I like	.596	.800
To escape from daily routine	.341*	.404*
Because I can build the playlist I want	.815	.768
To check on song and artist information	.539	.446*
Because it's available wherever I want to go	.331*	.706
As a rhythm to pace my work	.452*	.604*
Because I can get it on my portable device	.668	.728
Eigenvalue	2.42	11.74
Variance explained	.10	.27
Alpha	.80	.85

Table 5 – Deleted Statements

For background music
 To discover new music
 To be entertained
 Because it's convenient
 Because it's free
 To help give my life meaning
 To get musical surprises
 Because it's a habit
 To set the mood for my activities
 To make boring work more enjoyable

Conclusion

This chapter presented the basic methods used in this research for acquiring data from a convenience survey, the characteristics of the survey sample population used for that survey, the methods used for collecting and selecting appropriate gratifications statements, the generation of gratifications scales or factors and the methods used for testing the reliabilities for those factors. In the following chapter, we review the results of the data as it relates to the stated research questions.

CHAPTER 5 – RESULTS

RQ 1: Based upon niche breadth, is digital radio more generalized or specialized than traditional radio?

In addressing the question of niche breadth, it is helpful to remember that a medium that displays a higher number in niche breadth measurements will satisfy a broader variety of gratifications. Important to note is that a niche breadth of 1.0 is considered the upper bound of niche breadth; so a score closer to 1.0 will indicate higher breadth, which is interpreted as greater generalization in meeting gratifications. A lower score would then indicate a narrower ability to satisfy gratifications (J. Dimmick et al., 2000; Randle, 2003). Table 6 shows the niche breadth for traditional radio and digital radio, broken down by individual dimensions, as well as the total niche breadth. These results will be discussed in the next chapter. A brief answer is that digital radio, with a total niche breadth of .43, is more generalized in satisfying gratifications, versus traditional radio at a total niche breadth of .24.

Table 6 - Niche Breadth for Traditional and Digital Radio

	Traditional	Digital
Information Seeking	.16	.14
Passive Mood Setting	.39	.59
Social Utility	.20	.36
Self-actualization	.20	.64
Total niche breadth	.24	.43

RQ 2: Where do digital radio and traditional radio overlap?

Table 7 shows the niche overlap results for traditional and digital radio. Niche overlap measures how much duplication, or overlap, exists in the level to which different media meet gratifications. If a greater overlap exists between the two media, then they can be considered as functional alternatives for each other, and are more likely to be in stronger competition for given gratifications and usage by listeners. If less overlap exists, these two media can be considered complementary to each other, and can more easily coexist. Generally speaking, an overlap score of 1.31 or less indicates higher overlap and stronger competition, whereas a higher score, up to 5.0, indicates total dissimilarity (J. Dimmick et al., 2000). So traditional and digital radio are strongest competitors in the Information Seeking dimension; Passive Mood Setting and Social Utility allow more dissimilarity, yet still do have a fair amount of competition; and Self-actualization shows the highest level of separation between the two media, suggesting a more complementary relationship between the two media in that dimension. Overall, a total niche overlap score of 2.55 suggests a moderate degree of overlap between traditional and digital radio.

Table 7 - Niche Overlap for Traditional and Digital Radio

	Overlap
Information Seeking	1.59
Passive Mood Setting	2.27
Social Utility	2.39
Self-actualization	3.96
Total niche overlap	2.55

RQ 3: Where does digital radio demonstrate superiority over traditional radio? Where is traditional radio superior over digital radio?

The third research question assesses niche superiority for each of the media in the various gratifications dimensions. Table 8 shows whether traditional or digital radio is superior in the respective dimension, and, because the scores are calculated as arithmetic means, a two-tailed, paired sample t-Test can be applied to ascertain significance. In-depth analysis of these numbers will follow in the next chapter. The Information Seeking dimension did not show an adequate level of significance, and thus cannot be deemed useable for this research. In every other dimension, including overall, digital radio is heavily superior in fulfilling user gratifications.

Table 8 - Niche Superiority Values and t-Tests for Traditional and Digital Radio

	Traditional	Digital	t	p
Information Seeking	5.43 >	4.46	1.61	.11
Passive Mood Setting	2.36 <	13.20	-15.66	<.01*
Social Utility	3.84 <	15.13	-15.56	<.01*
Self-actualization	3.01 <	39.23	-33.79	<.01*
Superiority total	3.66 <	18.00	-23.29	<.01*

Note: df = 347

RQ 4: What gratifications are unique to digital radio, and what are shared with traditional radio? Are there similarities in gratification dimensions?

The research survey instrument asked participants to rate their gratifications obtained from both traditional and digital radio, as it related to 32 different gratifications. Each was rated on a Likert scale of 1 to 5, with 1 being “never” and 5 being “always,” as far as how often that

particular gratification was achieved with the listed medium. The 348 participants' scores were then averaged. Overall, traditional radio had an average rating of 2.18 across all gratifications, and digital came in higher at 3.06. The gratifications where digital radio scored higher than that average are listed below, with corresponding higher-than-average traditional scores. Where there is no score, it indicates a lower than average score. All gratifications were shared across both platforms to some degree, but the ones that were most unique to digital were "Because I can choose music I like," "Because I can build the playlist I want," "Because I can get it on my portable device," and "To make boring work more enjoyable."

Table 9 - Gratifications for Digital Radio Receiving Higher-than-average Ratings (Compared with higher traditional radio scores)

Gratification	Digital	Traditional
To be entertained	4.3	3.4
For background music	4.2	3.4
To discover new music	4.0	2.7
To set the mood for my activities	3.9	2.4
Because it's available wherever I want to go	3.8	2.8
To energize me	3.8	2.6
Because it's convenient	3.7	3.0
To pass the time	3.6	2.8
Because it's free	3.4	3.3
Because it's a habit	3.4	2.8
To alleviate boredom	3.3	2.7

*Table 10 - Gratifications for Digital Radio Receiving Higher-than-average Ratings
(Compared with lower than average traditional radio scores)*

Gratification	Digital	Traditional
Because I can choose music I like	4.3	-
Because I can build the playlist I want	4.2	-
Because I can get it on my portable device	4.1	-
To make boring work more enjoyable	4.0	-
To express my taste in music	3.5	-
As a rhythm to pace my work	3.4	-
To escape from daily routine	3.2	-
To check on song and artist information	3.1	-

CHAPTER 6 – DISCUSSION

This research is based upon a scale survey of 32 gratifications statements applied to usage of traditional radio and digital radio. Most of these statements have a foundation in gratifications statements from earlier media studies. After the data was gathered and tabulated, a factor analysis clustered the statements into six overall factors with an Eigen value greater than 1.0. We sought commonalities among the clustered statements, and then labeled the resultant factors based upon dimensions of media gratification that have appeared in previous research.

The first factor is Information Seeking. This factor encompasses activities with radio where the listener seeks and exchanges information. Information Seeking, also known as surveillance, has precedent as a factor based upon numerous bodies of research (Stark & Weichselbaum, 2013; Sundar & Limperos, 2013; W. Towers, 1985).

The next factor to emerge was Passive Mood Setting, with statements that deal with a listener's ability to acquire gratifications passively, often subconsciously. These gratifications often have to do with avoiding loneliness and boredom. This factor is similar to those labeled by other researchers as gratification opportunities, mood changing, or affective gratifications (A. Albarran et al., 2007; McClung et al., 2007; Stark & Weichselbaum, 2013).

The third emergent factor was Social Utility, which encompasses the gratifications dealing with socializing, companionship, and interaction with others. This includes imagined or para-social interaction with radio personalities. Social Utility, also known as overcoming social isolation or social interaction, as a dimension can be traced to multiple bodies of research (Chung & Kim, 2009; Houghton-Larsen, 1982; McClung et al., 2007).

The final of the four factors used in this research was Self-actualization. This factor is common to communications research, in a number of studies (Freire, 2007; Randle, 2003; Stark

& Weichselbaum, 2013). Self-actualization in this research applies to ways that listeners can take action and incorporate radio into accentuating or changing various aspects of their day-to-day lives. It also includes the ways that radio can make their lives easier.

Two more factors did not load cleanly enough to make the final research. The statements associated with those factors were also dropped from the final niche calculations because they did not meet the minimum criteria of high enough factor scores, clean loading across one medium, and the ability to raise alpha scores if included. With a remaining list of 22 gratifications statements, there was ample ability to assess levels of gratifications in each of the four factors, and to be able to use this data to assess niche calculations.

Still, one would ask, why were these gratifications statements so difficult to load cleanly in a factor analysis? I tried to identify many different iterations of factors and many different clusters of statements, looking for ways to make them load cleanly in both the traditional radio and digital radio categories. Some statements were definitely easier to cluster than others. Also, some statements that clearly seemed to be similar in scope and direction, did not load to the same factor, and others that did not seem to be closely related did cluster together. Overall, the clustering of the gratifications statements and their grouping under the indicated factors were not as parsimonious as I would have liked them to be.

One possible explanation for these problems in loading statements into factors would be a lack of experience on the part of the researcher in devising the initial research questions. This could lead to possible confusion from survey respondents as they rated the gratification statements, which would then distort the placement of those statements across factors. Part of what allowed these possibly faulty statements to go further was the fact that, in running a Chronbach's Alpha score on their reliability, they actually performed quite well, generally

scoring at .70 or above. But once those weaker questions were placed in front of the sample population, it seems that some of them must have been interpreted differently than originally intended. Further analysis and study on clearing up the list of questions would be highly warranted.

A potentially larger variable that came into this research is the discrepancy between the manner in which previous audiences consume media, and the manner in which it is consumed presently, especially by the demographic group we sampled. When there were just a few television channels, one or two newspapers in a given city, and a few AM and FM radio channels, media consumers traditionally would choose a medium that served their needs, and exhibit a certain amount of loyalty to it. The possibility of consuming any of those media simultaneously would be almost unthinkable. Today's young media consumers commonly will be simultaneously using three or four different providers of media at a time. For example, a person could be listening to a podcast while surfing the internet and keeping an eye on a Netflix movie playing in the background, occasionally checking Twitter and their chat application on their smart phone. That multitasking media activity is simultaneously satisfying a whole list of gratifications, and parsing out single gratifications may be problematic for this age group. This could have accounted for the gratifications unevenly scattering across factors in this study. We will discuss this concept further in the next chapter.

Research Question Analysis

Niche breadth was calculated for traditional and digital radio in each of the four factors. Research question one asks "is digital radio more generalized or specialized?" Overall, digital radio showed a niche breadth of .43; traditional radio had a niche breadth of .24. With a score of 1.00 being the most generalized possible level for a medium, a score of .43 is somewhat broad,

but not highly generalized. Looking at the individual factors sheds more light on which areas are more generalized for digital radio, and which ones narrow down to specialization. In the first factor, “Information Seeking,” traditional radio has a niche breadth of .16, and digital radio has a breadth of .14. Again, against a score of 1.00, each of these media are extremely narrow in the Information Seeking dimension. Therefore digital radio is more specialized in Information Seeking. That may seem surprising, given the predominance of search engines like Google on digital media, but it’s important to remember that this is a survey about digital audio media and radio specifically, and, according to this research data, this audience does not look to digital audio for a generalized information seeking experience.

In the “Passive Mood Setting” factor, traditional radio has a breadth of .39, with digital radio scoring .59. This indicates a high amount of generalization and breadth for digital radio in helping a listener to enjoy mood-setting activities. This may be due to the many different ways music and content can be accessed on the internet and through handheld devices, allowing the content to be incorporated into day-to-day activities.

“Social Utility” showed niche breadth scores of .20 for traditional and .36 for digital radio. This indicates a narrowing down of scope for digital radio in the social area of gratifications. It is not as low as traditional radio, and certainly not as low as the information-seeking factor, but still the breadth score is fairly specialized. Again, a medium that shares space with social media and all of the other social venues on the internet may be surprising in its limited breadth for social interactions on digital radio, but that most likely speaks to the usage of the medium. From this analysis, it would seem that digital radio users treat their digital music and content experience as an individual experience more than a social one.

The highest digital radio niche breadth score came in the factor of “Self-actualization.” Digital radio scored .64, with traditional radio a far more specialized .20. This speaks to the ability of internet-based media to be able to gratify a user’s need to customize, time-shift, choose their favorite music and playlists, and get their radio wherever they want it.

Definitely, between digital radio and traditional radio, digital has a larger niche breadth, making it more generalized in its ability to satisfy a larger number of user gratifications. However, with a total niche breadth score of just .43, digital radio is still fairly narrow in its overall approaches to serving gratifications of listeners. As such, based upon this research, digital radio is still more specialized than generalized. The fact remains that digital radio approaches a breadth that is almost double that of traditional radio, so digital radio would be more adept at adapting to change.

Research question two asks where digital radio and traditional radio overlap in niche gratification satisfaction. This is an important question to answer , because, as Dimmick stated previously, a combination of high overlap and high superiority is needed for a given new medium to be able to replace an existing medium in a niche media environment (J. Dimmick et al., 2000).

In the Information Seeking factor, overlap between digital and traditional radio is 1.59. If 1.30 is total overlap, and 5.0 represents total dissimilarity, then a score of 1.59 represents a very high level of overlap in information gratifications. In other words, when it comes to information gathering, digital radio could foreseeably replace traditional radio. But based upon the information seeking superiority score, traditional radio is slightly superior, negating the overlap advantage that digital radio shows. We will discuss that further in a moment. The overlap score for the next factor, Passive Mood Setting, has an overlap score of 2.27. Thus digital and

traditional radio have a medium amount of overlap in their abilities to satisfy gratifications in sub-conscious, passive activities in their listeners. Social Utility has a similar medium-level niche overlap score of 2.39. Again, the two media have a moderate level of overlap in their abilities to meet the social gratifications of listeners. Finally, in the area of Self-actualization, the two radio media have a fairly low level of overlap, with a niche score of 3.96. Thus, traditional radio and digital radio each are unique in their approach to helping listeners find self-actualization through listening to the separate types of radio channels, and radio users seem to find this separate approach useful.

Research question three asks where digital radio shows superiority over traditional radio, and vice versa. The trends that were found in niche breadth and overlap seem to continue in niche superiority scores. In Information Seeking, traditional radio, with a mean score of 5.43, is slightly superior to digital radio's mean score of 4.46 in meeting gratifications for finding and sharing information. As we discussed in the previous paragraph, the niche overlap for Information Seeking gratifications between digital and traditional is relatively high, suggesting a possibility for one medium to replace the other. Either the new medium, digital radio, could replace traditional radio, or, because traditional has a slightly superior niche rating, traditional could keep digital out of the information realm. But the superiority scores are too close to warrant that. There is not a clear preference for either medium. This is borne out by the t-Test significance level of .11. With a significance level that far out of the 95% curve, it signifies that the superiority rating for this set of data cannot be reliably trusted, and thus it should be thrown out. So, effectively, there is no dimension where traditional radio shows superiority over digital radio. The other niche superiority scores have a reliability significance rating less than .001, meaning that there is a less than a .01% chance that these mean scores could occur randomly, so

they can be counted on as strong indicators of preference among the survey participants. They show that in the Passive Mood Setting dimension, digital radio strongly outscores traditional with a mean of 13.20 to 2.36. Social Utility gratification preferences are even stronger, with digital's mean score of 15.13, compared to the traditional mean of just 3.01. And, by far the strongest show of superiority comes from the Self-actualization factor, with a digital mean of 39.23 eclipsing the traditional radio mean of just 3.66. Clearly, this sample of radio listeners feels that digital radio is far superior to traditional radio in meeting their expected gratifications.

So what do these numbers mean for the media environment occupied by traditional and digital radio? There is no question that the sample audience of 21 year olds are highly enthusiastic about the ways that digital radio meets their needs and gratifications. True, when it comes to actually using the media, there is still a large number of people listening to both traditional and digital radio. A longitudinal study would be useful in ascertaining whether or not that crossover would continue, or if the preference for digital radio would cause these listeners to find more ways to use digital over traditional.

Based upon Dimmick's statements, because there is not a universal high overlap, even though there is high superiority on the digital side, traditional and digital radio could possibly be functional complementary media. Gratifications satisfied by traditional radio can be different than those satisfied by digital (J. W. Dimmick & Rothenbuhler, 1984).

Answers to the final research question can help explicate some of these possibilities. It asks "what gratifications are unique to digital radio, and what ones does it share with traditional radio?" The research found that there were five gratification statements where the average mean scores of digital radio, though higher than those of traditional, still came close, and thus were seen as sharing these gratifications with traditional. These scores were higher than average for

both traditional and digital. The statements seemed to center around music, entertainment, mood setting and convenience. The common statements are “to be entertained,” “to energize me,” “for background music,” “to discover new music,” “to set the mood for my activities,” “to pass the time,” “because it’s available wherever I want to go,” and “because it’s convenient.” So the ability to use music to gratify needs, to let the radio set the mood, and to take advantage of radio’s ease of access seems to be shared across the two media. On the other hand, there were some specific gratifications that seemed to be more unique to digital radio. These were statements that had higher than average mean scores for digital, and lower than average means for traditional. Most of these eight statements dealt with the ability to customize the medium to fit the listener’s lifestyle, and reflected digital’s inherent, or perceived, ability to be flexible. The statements are “because I can choose music I like,” “because I can build the playlist I want,” “to express my taste in music,” “to check on song and artist information,” “as a rhythm to pace my work,” “to make boring work more enjoyable,” “to escape from daily routine,” and “because I can get it on my portable device.”

Examining specific statements from the Information Seeking factor, along with their mean ratings, can shed more light on why both digital and traditional radio came in at such a narrow niche breadth overall. The only statement in this factor to come in with even an average mean score was “to learn something new.” All the other gratifications statements about acquiring information and trivia, following sports teams, and expressing political views came in under a mean score of two. Remember, a score of one equals “never” having that particular gratification met by that medium; across these four gratifications statements, the scores were equally low for both digital and traditional radio. That seems surprising, especially because traditional radio is often seen as the place to go for news, talk and sports; and, as mentioned earlier, the digital

internet realm is the first place this demographic usually goes to find information. The most probable answer is that, to a 21-year-old, neither form of radio is seen as a credible, convenient place to get information of any sort, especially when Google and Wikipedia are so easy to access. Programmers of radio content should take note that, for this age group, radio is not the place to go for information sound bites.

In the Passive Mood Setting factor, digital and traditional radio scored higher than average mean ratings on gratifications dealing with helping a listener overcome boredom, getting energized and passing time. As radio content providers build programming, it can help to know that, at the most fundamental level, all forms of radio can help listeners to improve their daily activities just by having the radio on. Worth noting is that, in this dimension, digital radio scored higher means than traditional radio across the board.

Not surprisingly for this sample of twenty-somethings, traditional radio scored mean averages of close to one (never using the medium) in four of the six gratifications for Social Utility: that listening to it is sociable, that they listen because others are doing it, that they listen because it is live, and because they can interact with the station. Again, this indicates that these respondents almost never listen to traditional radio for those reasons. On the digital side, respondents almost never listened to it simply because it is live or because others are doing it. The concept of live radio is possibly an artifact from bygone days that may not need to come back. The one gratification that scored a higher than average mean was that they listened to digital radio to express their tastes in music. This seems to relate to the tendency for this demographic to want to post their preferences for others to see about various aspects of their lives. With digital radio, music can be one of those preferences. Radio executives can use that information to build in the ability to share music preferences with a listener's social circle.

For Self-actualization statements on traditional radio, low mean scores accompanied the various gratifications dealing with choosing music, building playlists, getting song and artist information, and getting the radio on their portable device. The one statement that scored higher than average for traditional radio was that it is available wherever the listener is going. That speaks to the fact that, despite the lack of “bells and whistles” on traditional radio, it still has value as a convenient, easy-to-access form of media. Conversely, every single statement in this factor scored higher than average means for digital radio. This strongly suggests that this sample demographic is attuned to digital radio as a dynamic, interactive medium with the ability for them to customize, personalize, and utilize digital radio for their personal actualization. Any programmer that wants to reach this audience should focus heavily on the features of their station that help the audience choose what they want.

CHAPTER 7 – CONCLUSION

This study set out to explore the ways that digital radio in its many iterations might affect the existing media environment of traditional or terrestrial radio. Determining radio's uses and gratifications, and then filtering these through the theory of the niche, specifically as it applies to media environments, allows a clearer vision into areas where digital radio is stronger than traditional radio, as well as areas where the two media can comfortably co-exist.

Neither form of radio showed the ability to satisfy a broad array of information-seeking needs of its audiences. This could be a possible area of improvement for radio to address. With the wealth of information sources available on the internet and through mobile devices, a radio content provider who can create a viable form of disseminating an audio version of relevant information may find an opportunity for growth. On the other hand, Information Seeking may be an area that radio would be wise to concede to other providers on the internet. In lifestyle areas of mood setting, social utility and self-actualization, digital radio clearly showed a superiority over traditional radio. The various forms of audio content on the internet and mobile applications seem to be effective in reaching a college-aged audience. One of the few bright areas for traditional radio in this research is that it still has strength in the areas of dependability and ease-of-access. Overall, digital radio showed a very strong ability to be an active part of the lives of this young adult listening audience.

Since the 1950's, in-car use has been the mainstay of traditional radio listenership. This research continues to validate that. Future developments in bringing the internet into the automobile may play a role in moving digital radio listenership into that space now occupied by traditional radio. In addition, of the on-line music services available to digital radio users, the

fact that they choose a service like Spotify over Pandora seems to indicate that there is a strong desire to have more control over their own playlist of songs.

This study can be useful to help inform both traditional and digital radio owners, operators, and programmers in ways to reach this valuable audience of current and future listeners. Traditional radio can learn from the customizable, user-friendly features that are natural to the digital internet-based audio media, and incorporate those into its daily offerings for listeners. There is actually nothing preventing traditional radio from accessing all of the available features currently offered by digital-only radio stations. In an effort to look for the silver lining, the Radio Advertising Bureau noted that “streamed audio is not seen as replacing AM/FM radio or satellite radio listening. Streaming music services represent more of a format shift in music libraries, similar from the move from records to CDs or from CDs to digital downloads – a different way to distribute a personal music library” (Bureau, 2016). This could help traditional radio owners realize that, if they can incorporate the features that matter to this young demographic, and that digital is already using, they can satisfy their listening needs and stay relevant in the future.

Radio has a long history of learning from the competition and adapting to the changes. This would be an opportune time for traditional radio to look at these new forms of distributing its content, and, rather than fighting the change, embrace it and make it work in its favor. Digital radio can learn from the lean, quick response, and adaptable legacy that radio brings to audio content delivery, subsequently creating a medium that responds well to the changing needs of its audience. It can look to traditional radio to model its way of listening to its audience and building one-on-one relationships with its listeners.

Limitations to the Study

This survey was a convenience sample of 348 college-aged students taking a lower-level communications course at a large western university. Their average age was 21 years old. While this does represent a viable audience for radio, it still is not generalizable to the broader national population. The responses are more specific to the tastes and gratifications of a 21 year old. A future study could broaden the response base, via internet survey or other survey instruments, to various older demographics. Also, because this sample was more heavily skewed towards women, future research would need to bring in a more gender-balanced population sample.

This survey was cross-sectional; thus it was a snapshot in time. A longitudinal study conducted over a number of years would be very valuable in determining the changing nature of gratifications in light of changing technologies and methods of audio delivery. Studying the listening activities of a person through the years would be informative in determining whether listening habits that are acquired at a young age are actually retained, as that person grows older.

The researchers worked hard to clearly define the difference between the two radio media in this study. However, there are enough gray areas between the definition of *traditional* and *digital* radio, that there may have been a possibility for confusion on some of the answers, and application of gratifications toward either or both of the media.

In the usage of niche theory for analyzing media, Dimmick himself points out a few of its limitations. Specifically, niche theory is much better at looking at the past and present, and is not very good at predicting the future when it comes to media habits and activities. He relates that “niche theory is better suited for ‘anticipation’ than ‘prediction.’ It is more useful for describing and explaining the past and present than for making long-term predictions about the fate of media guild members” (J. W. Dimmick & Rothenbuhler, 1984; Randle, 2003; Stark &

Weichselbaum, 2013; Sundar & Limperos, 2013). Therefore, while niche theory is very useful to help us explicate where people are listening, what they are listening to, and why they are listening to it, these models do not necessarily point us in a direction as to how these subjects will perform in the future.

Niche theory was born in the biological realm, measuring species' responses to competition for scarce resources. It was brought in to the media realm initially to measure competition for the scarce resources of audience and advertising dollars. It was then modified to measure the ability for competing media to successfully satisfy gratifications for audience members. This approach assumes that media gratifications are finite or scarce. This research seems to indicate that this may not be the case. The young demographic sample we measured is adept at multi-tasking their media use. Simultaneously accessing audio, print, text, and visual media may confuse the issue of deciding which gratifications are met specifically by one medium at a time. Opposed to being finite, gratifications can actually "fill the interstices" or space left by other media (Dimmick, Feaster, & Hoplamazian, 2011). As long as media consumers can multi-task, they can add media and, essentially, increase their gratification satisfactions with no clear boundaries or limits. Clearly delineating a winner and loser in a media gratifications environment may not work with a multi-tasking media consumer.

Areas for Future Research

Following up on the previous section, a valuable study could research whether gratifications are finite and scarce, or are they expandable and able to multiply to fill available space. This could inform a new area of niche theory, or could branch off into a new area of gratifications satisfaction among media multi-taskers.

The survey instrument touched upon a few of the delivery channels for digital radio. Subsequent research would be wise to focus on the gratifications of individual digital delivery channels. For instance, a researcher could conduct a niche theory study of on-demand options, such as podcasts, curated audio and song streaming services.

The discussion earlier outlined some of the problems encountered with unclear gratifications statements and factor loading. Future studies could clarify the statements, possibly conducting open-ended focus groups to ascertain from representative listening audiences the gratifications that they would expect from traditional radio and digital radio. These could then be compared to past gratifications, and added to the research as statements that more closely align with current values in younger listeners.

There are areas related to radio that have been under-represented in the research field, yet that would help to inform future directions for audio content delivery. Further study into the old model of caller interaction with radio stations would be a natural area of research. A niche theory analysis between radio station call-ins and on-air twitter interactions would be one way to address gratifications provided by these features of radio. Music licensing continues to be a murky area for audio content providers, as well as audio content users. A historical study of music licensing with quantitative analysis of distribution models and efficiencies could benefit all sides of audio production and consumption. A look at the role of the radio announcer, and analysis of the gratifications satisfied by a live presence versus an automated or digital moderator or avatar could be useful for future radio operations studies. Finally, research into the value placed on audio content that is customized to a local audience versus a national focus would be a valuable addition to current research.

This research points out the tendency of the current generation of media consumers to multi-task their media usage and look for ways to make the media suit their lifestyle. An old tenet of business is to keep focused on the core unique ability of a business to meet a specific need. If we “take our eye off that ball,” we tend to blur the lines and not be able to deliver any product well. That maxim may be outdated. New research could look at whether a medium can better serve their audience as a specialist, or as a generalist.

The study of niches in ecological environments brings to mind the pre-historic landscape of the dinosaurs, and their response to changes in the environment. Did all the dinosaurs die? No. A few survived. They were the ones who were nimble and able to adapt to change, “flying above” the cataclysmic events happening down on the ground. And they survive today – avian dinosaurs – or birds. Radio, in its various forms has been, and can continue to be very much like those birds – it can be light on its feet, it can run lean, it can adapt quickly to change. It has done this in the past. If it will, it can continue this legacy through future changes. This research suggest that the new generation of radio users look to radio to satisfy lifestyle gratifications, while having it be where they want, when they want it, on their terms. Is radio up to that challenge? From the first spark generated by Heinrich Hertz, to the current wave of internet-based podcasts and streams, radio has a rich history of invention and innovation. It has been, and continues to be, a medium that is quick on its feet, demonstrating a keen ability to adapt to changes in the tides of public media consumption. The new millennium has brought a veritable “Gutenberg Moment” where media need to adapt to major changes in the environment. Time will tell if traditional radio is up to the latest challenges, and what the new face of radio will be in the coming century. All forms of radio need to be ready to not only ride the wave, but to be on the cresting edge of where that wave is going.

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APPENDIX A – SURVEY INSTRUMENT

Radio Listening Survey

My name is Don Shelline. I am a graduate student at Brigham Young University and I am conducting this research under the supervision of Professor Quint Randle, from the School of Communications. You are being invited to participate in a Radio Listening Survey. I am interested in finding out about the uses and gratifications experienced by college-aged students as they listen to traditional and digital radio stations.

Your participation in this study will require the completion of the attached survey. This should take approximately fifteen minutes of your time. Your participation will be anonymous and you will not be contacted again in the future. You will not be paid for being in this study. This survey involves minimal risk to you. The benefits, however, may impact society by helping increase knowledge about radio listenership and listeners' usage of new and old forms of radio.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research-related problem you may contact me, Don Shelline, at don.shelline@byu.edu, or my advisor, Quint Randle, at quint_randle@byu.edu.

If you have any questions about your rights as a research participant you may contact the IRB Administrator at A-285 ASB, Brigham Young University, Provo, UT 84602; irb@byu.edu; (801) 422-1461. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

The completion of this survey implies your consent to participate. If you choose to participate, please complete the attached survey and return it during this class period. Thank you!

Note: This survey has 4 pages. If applicable, please complete all 4 pages of this survey.

Traditional Radio Listening Survey

Traditional radio— Music, news, talk and sports programs that are on the FM and AM channels in your car and home radio sets, as well as satellite radio. Examples of channels: 1160 KSL, X96, FM 100, K-Fan Sports Radio, and SiriusXM.

Did you listen to traditional radio anytime in the past 7 days? Yes () No ()

If you did listen to traditional radio this past week, estimate an average of approximately how many minutes per day you listened. _____

Where did you listen to traditional radio? (check as many as apply)

- _____ Home
- _____ Car
- _____ Work
- _____ Other: _____

Digital Radio Listening Survey

Digital Radio – Talk and music programs that are on your computer, tablet or phone. You can stream them or listen on-demand. Examples are Pandora, Spotify, Slacker, Tune In, iTunes Radio, and LastFM.

Digital Radio does not include just downloading songs (from iTunes, for example) and playing them on your portable player.

Did you listen to digital radio anytime in the past 7 days? Yes () No ()

If you did listen to digital radio this past week, estimate an average of approximately how many minutes per day you listened. _____

Which digital internet audio service did you use? (check as many as apply)

- _____ Pandora
- _____ Spotify
- _____ iTunes Radio
- _____ TuneIn
- _____ iHeart
- _____ Podcast
- _____ Google Play
- _____ Other: _____

Radio Listening Survey

Based on the following statements, rate your usage of traditional and digital radio. After reading the reason to use radio, if it applies to traditional radio, circle the number closest to how often you feel the statement is true (1= Never, 5= All the time). Then do the same for digital radio. If any statement does not apply to you, circle the "1" on the appropriate lines.

<i>I listen to radio...</i>	<i>Traditional Radio</i>					<i>Digital Radio</i>				
	Never				all the time	never				all the time
To acquire information	1	2	3	4	5	1	2	3	4	5
Because it's sociable	1	2	3	4	5	1	2	3	4	5
For background music	1	2	3	4	5	1	2	3	4	5
For companionship	1	2	3	4	5	1	2	3	4	5
To discover new music	1	2	3	4	5	1	2	3	4	5
To learn something new	1	2	3	4	5	1	2	3	4	5
Because I can choose music I like	1	2	3	4	5	1	2	3	4	5
To escape from daily routine	1	2	3	4	5	1	2	3	4	5
Because I can build the playlist I want	1	2	3	4	5	1	2	3	4	5
To express my political views	1	2	3	4	5	1	2	3	4	5
To check on song and artist information	1	2	3	4	5	1	2	3	4	5
To be entertained	1	2	3	4	5	1	2	3	4	5
Because it's available wherever I go	1	2	3	4	5	1	2	3	4	5
To pass the time	1	2	3	4	5	1	2	3	4	5
As a remedy for loneliness	1	2	3	4	5	1	2	3	4	5
Because it's free	1	2	3	4	5	1	2	3	4	5
To help give my life meaning	1	2	3	4	5	1	2	3	4	5
To energize me	1	2	3	4	5	1	2	3	4	5
As a rhythm to pace my work	1	2	3	4	5	1	2	3	4	5
Because it's convenient	1	2	3	4	5	1	2	3	4	5
To follow my favorite sports teams	1	2	3	4	5	1	2	3	4	5
Because others are doing it	1	2	3	4	5	1	2	3	4	5
Because it's live	1	2	3	4	5	1	2	3	4	5
To acquire trivia	1	2	3	4	5	1	2	3	4	5

I listen to radio...

	Traditional Radio					Digital Radio				
	Never				all the time	never				all the time
To alleviate boredom	1	2	3	4	5	1	2	3	4	5
To get musical surprises	1	2	3	4	5	1	2	3	4	5
To express my taste in music	1	2	3	4	5	1	2	3	4	5
Because it's a habit	1	2	3	4	5	1	2	3	4	5
To set the mood for my activities	1	2	3	4	5	1	2	3	4	5
Because I can get it on my portable device	1	2	3	4	5	1	2	3	4	5
To make boring work more enjoyable	1	2	3	4	5	1	2	3	4	5
Because I can interact with the station	1	2	3	4	5	1	2	3	4	5

Optional Personal Information

Age: _____

Gender: _____ Male
_____ Female

Year in College: _____ Freshman _____ Sophomore _____ Junior _____ Senior _____
Graduate

Home State: _____

Thank you for your participation in this survey.