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IDENTIFYING THE PERCEPTIONS AND EFFECTIVENESS OF CURRENT COPYRIGHT LAW AND DIGITAL RIGHTS MANAGEMENT TECHNOLOGY

By

Kasey Pearl-Lee Branam

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ABSTRACT

IDENTIFYING THE PERCEPTIONS AND EFFECTIVENESS OF CURRENT COPYRIGHT LAW AND DIGITAL RIGHTS MANAGEMENT TECHNOLOGY

By

Kasey Pearl-Lee Branam

This paper examines how United States copyright law has evolved and the current perceptions of it today. The paper focuses on the copyright infringement of music, through several methods such as digitally distributing music through Peer to Peer (P2P) file sharing. It then explores one way in which the music industry has tried to make it more difficult to steal digital music files known as digital rights management (DRM). A survey elicited the effectiveness and overall opinions (of this technology as well as the current state of copyright) of college students at Michigan State University. The findings are discussed and inferences about the effectiveness of DRM are drawn. This paper brings insight into views of college students towards DRM. Although DRM is not found to be useless, it may not be the best way to protect copyright holders.

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Introduction

Copying, distributing and publicly performing works has become simple not only for copyright holders, but anyone with a computer and network access. Additionally, the popularity of websites that illegally display copyrighted material and of technologies like BitTorrent that allow for illegal downloading, could lead to a conclusion that it is a social norm to ignore copyright laws.

Intellectual property protection is first addressed in Article I, Section 8, Clause 8 of the U.S. Constitution which established a basis for U.S. Copyright law. It was then clarified in following Acts, the first being the Copyright Act of 1790. Several more Acts have modified copyright law in the U.S., many of which prolong the duration of copyright protection. They also include adaptations needed to address the effects of new technologies, included digital technology, on copyright law. Despite a longstanding history of Copyright Law, copyright protection is still a hot topic of debate between intellectuals, law-makers, and the average users of digital content.

The duration of copyright has been increasingly lengthened. The latest increase gave power to copyright holders to monopolize the work for which they own the copyright for 70 years after the death of the original creator; however there are other issues with copyright that are not so lucid (Wolters Kluwer, 2007). There are numerous cases that try to clarify the blurred lines of what should and should not be protected under copyright. Neither facts nor ideas can be copyrighted, but at what point does the "idea" become concrete enough to be copyrighted? The law states that once a creative work is fixed in a tangible medium of expression, copyright is automatically established.

However, even that can be confusing. If Mickey Mouse is copyrighted, to what extent does that copyright extend? Could you or I draw a cartoon mouse and sell it? What if the mouse sings and has a pet dog? What is the distinction between a cartoon mouse and the copyrighted character "Mickey Mouse"? Are there instances when even copyrighted figures can be used by individuals not holding the copyright? Where is the line that allows "fair use" to come into effect? It is this "idea versus expression dichotomy" that contributes to the blurring lines within the law.

Previously, content was difficult to reproduce, especially in mass quantities, and protecting copyright was only partially a technical story. However, easy access to digital content and the technical difficulty inherent in upholding copyright laws in regard to that digital content have caused a change in copyright protection. Instead of focusing solely on legal recourse for copyright infringement, copyright holders found a technical solution; Digital Rights Management (DRM) technology. DRM aims to protect files from being distributed or tampered with using technical, rather than social, solutions. However, to what extent is DRM effective at preventing copyright infringement? And if it is effective, is there a particular type of user it is effective against? There is a movement of people who are anti-copyright. These people are against the entire system, they think the problem lies in the copyright laws themselves, and not in downloading music or movies. Is it really possible to use DRM to stop these people, who believe it is morally acceptable and even preferable to illegally download and share digital files?

It is the purpose of this paper to look at these underlying questions of illegal file sharing, namely of music files. The paper will begin by taking a brief look at the history and current state of copyright law, in order to set the environment in which policy makers

have been submerged. It will then discuss the explosion of "peer-to-peer" (P2P) file sharing in the late 1990s continuing on through today. Then an overview of the current research and literature into issues, causes and effects of P2P file sharing will be provided. The paper will continue by addressing DRM as a possibly effective way to prevent some of this file sharing, giving an example of a current business model utilizing DRM and why it may be moving away from it. A study of how undergraduate students perceive copyright in general and DRM in particular will then be introduced with methods to be followed by results. In conclusion, the researcher will address the possible implications of the findings and recommendations for copyright policy in the future. The question this thesis aims to answer is if DRM technology is enough to change human activity (i.e. if students want to do something like illegally share music files, will technology be able to stop it)? It is hypothesized that DRM will not be effective at deterring students from illegally downloading or sharing music files if these acts are thought be a social norm.

1. Review of Copyright Law

1.1 Origins of Copyright

Property is a widely known concept that often is conceptually understood as a tangible object that can be owned by an individual or individuals. The United States law protects the ownership of property by prohibiting individuals not enjoying ownership to take or damage the property without the consent of the property owner (Wolters Kluwer, 2007). While this seems like a straightforward concept, this principle has also been attached to objects that are not quite as concrete.

In the Constitution of the United States of America, Congress was given "the power to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries" (Article I, Section 8). This allows for less tangible objects to be thought of like property and subsequently gives creators and inventors ownership rights that allow them control over their creative works. Although more technically defined as a licensed monopoly given to one person or entity over the creation, often the idea of property is aligned with copyright law (Herman, 2008).

There are different theories explaining why such a right like copyright should be established. There is a natural rights perspective based on John Locke's ideas in "The Treatises on Government". He explains how every man should have not only rights to their own "person" but also to the "labor" of their own hands (Wolters Kluwer, 2007). This fostered the idea that one should have the rights to things gained from the "sweat of the brow" (Wolters Kluwer, 2007). There is another ideology that argues the rights of property should be given because of the relationship that is developed between people and certain personal objects. This "property of personhood" view represents the idea that property cannot be separated from the person, therefore something created by that person is innately owned by them (Wolters Kluwer, 2007). Lastly, an economic perspective would argue that copyright should be established if for no other reason than that of granting an economic incentive to create. However, even when taking the more social claim to the moral right for individuals to have "the fruits of their labor," the same point is clear: there is an economic base incentive in copyright (Wu, 2004).

Copyright law is one of four areas of law that protect the intangible objects known as "intellectual property." The intellectual property that copyright focuses on are creative works fixed in a medium. Similar to physical property, intellectual property can be bought and sold, and disposed of in other ways, giving it inherent value. However, there is a clear distinction to be made between intellectual property and tangible property. Unlike material goods, intellectual property does not diminish with each use. If 50 people read a poem or 50,000 people read it, the poem will not lessen in value. This is not similar to the common example of a bushel of apples, which would need to be replenished with more apples after every use (Wolters Kluwer, 2007). This phenomenon is described by economists is that it is a "nonrival" good (Benkler, 2006).

Another way that intellectual property can be described is by looking at the marginal cost of production for information goods. Although the actual material on which intellectual property is printed costs money for each printing, the expense to create the product (in terms of time and thought) has already been taken, so the cost of reproduction is subsequently less with reproduction (Benkler, 2006). The limited exclusivity the Constitution establishes over intellectual property allows for a demand curve to be established over property, which is otherwise intangible. Although the intellectual work is done after the poem, for example, is written, every time the poem is reprinted and sold there is a value on not only the paper, but the poem itself. This economic incentive is meant to encourage creation, for the betterment of society, by rewarding artists with the possibility of revenue (Ponte, 2006). The risk is that too much control over creative works will not allow others to build off of them and create new works. One way to look at this, according to some "incentive" theorists, is the need to balance the benefits that the

customers receive with the imposed costs on the consumers and new creators (Wu, 2004). The society benefits from creation, but if it is unable to grow and build from creative works and ideas then it may be in danger of becoming stifled. To reference Isaac Newton as Yochai Benkler did, we cannot stand on the shoulder of giants if the giants do not, in fact, let us climb up (Benkler, 2006). Copyright may not completely prevent our ability to build on creative works, but there are examples where it does, which will be discussed later in this paper.

1.2 Rights Granted by Copyright

Copyright law grants several rights to the owner. The right to reproduce a copyrighted work, prepare derivative works, distribute copies of the work, publicly perform the work, and publicly display the work are all protected under copyright. As soon as a creative work is fixed in a tangible medium the protection begins. (Wolters Kluwer, 2007). In order for any person to use the work in these ways, permission in the form of an assignment, and exclusive or a non exclusive license must be obtained from the copyright holder. An example of a regularly used license within the music industry is a compulsory license. This is a form of exemption allowing for certain activities, such as being able to provide a streaming service and only having to pay a fee set by the Copyright Royalty Board.

Without acquiring a license, if an individual or entity is accused of infringing on the copyright protection of a work, there are only a few defenses available. The "fair use" doctrine allows for those who do not own the copyright to copy without the permission of the copyright holder; however it is only used as an available defense. The courts would

consider a "fair use" defense by looking at the purpose and character of use, the nature of the copyrighted work, the percentage and amount of the old work that the new work utilizes, and the possible implications on the market value of the copyrighted work (Lim, 2004). This helps protect the copyright from being too restrictive and allows for uses such as for teaching or scholarship to continue. The courts may also consider a "*de minimus*" defense, which claims that the amount of work used was inconsequential and insignificant considering the copyrighted work as a whole. Claiming transformative use, which is when the new work has changed the original to the extent that it is no longer recognizable, may be a viable defense as well (Sirois, 2006). The last option for a defendant would be claiming a merger. Because copyright only protects expressions of ideas and not the ideas themselves, a merger would occur when the idea and the expression are so connected that it would be impossible to distinguish one from another, therefore making the copyright itself invalid.

The sound recording amendment of 1971, amending the Copyright Act of 1909, recognizes sound recordings and musical compositions as separate entities; each entity afforded copyright protection (Sirois, 2006). Therefore, if an artist records a song at a record studio, the artist would have rights to himself on the recording, but the record studio would also have rights to the recording as a separate entity. This could be considered a prelude to The Copyright Act of 1976 which "governs the use of all literary artistic creations, including music, lyrics and compositions." Previously, music arguably was one thing which was traditionally found in the realm of the "public domain" which is not typically owned by anyone but instead shared by all (Sirois, 2006).

1.3 Current Perceptions of Copyright

These amendments were made prior to several advancements made in digital technology and the Internet. Economic incentive is not the only motivation behind creation. Sometimes creators like to keep their works available for public use, as happens with people who post content to the Creative Commons. Unfortunately, as time goes by, copyright laws have become restrictive to the point where it is affecting average consumers (Tushnet, 2004). With the expansion of technology, the ability for a person who is not necessarily technically expert to produce a copy has grown immensly and with this the lines of behavior around copyright have become more blurred. This is evident by the numerous copyright cases that have been presented in front of the Supreme Court in the last few decades. As fast as technology is moving forward, cases of alleged copyright infringement seem to multiply. From the copy machine to the computer, in a digital world it is getting easier to steal intellectual property. Any one with internet access and a bit of technological knowledge can go online, illegally download a recording of some pop music hit, and edit it for redistribution. With the internet, it is very difficult to contain this type of infringment because copies are easier to make and distribute. Copyright infringment cases are continually being brought to litigation. In fact, the "Courts have handed down inconsistant opinions in digital sampling cases applying different legal standards ranging from per se infringement to exceptions under fair use doctrines and de minums (Ponte, 2006). One can just look at two similar cases, to get an idea of the confusion.

One example of a discrepency found is under the De Minimus Doctrine, which allows for small samples of the work to be used so long as they are "so meager and

fragmentory that the average audience would not recognize the appropriation" (Wolters Kluwer, 2007). However, in the case of Bridgeport Music, Inc. et. al. vs Dimension Films et. al. 410 F.3d 792 (6th Cir. 2005) it was found that to directly take three notes of a digital recording (a process known as sampling) was not protectable under the Fair Use defense. A similar case, Newton v. Diamond et. al. 349 F. 3d 591 (9th Circuit, 2003) found that when the Beastie Boys sampled a flute track played by James Newton after only securing the rights to the sound recording but not to the composition, they were found to be protected under the fair use doctrine. Bridgeport Music, Inc v. Dimension Films and Newton v. Diamond both dealt with digital music sampling. In fact, they both dealt with just three notes. However, the cases had opposite outcomes (Ponte, 2006). The judicial confusion is the only thing that is clear with these examples. One court used qualitative analysis of fragmented similarity, the other looked at per se infringement. But even if they had managed to apply the same tests, the tests do not seem to fit. For instance, if the court looks at the substanciality of three notes, but those three notes are looped 30 times throughout a song, there is no standard for how this should be interepreted. The courts "applied different tests, missed key aspects of copyright law and managed to further confuse the music industry about how to avoid digital sampling law suits" (Ponte, 2006).

In the Bridgeport decision, the opinion stated that even copying one note would be considered infringment and a license would need to be obtained. However, when Congress decided to give copyright protection to sound recordings, it was explitily stated that the protection was only to be available when a substancial amount as been appropriated (Ponte, 2006). Congress forbid recording of "actual sounds fixed in the

original recording" (Sirois, 2006). Though this was meant to protect against pirating entire songs, Congress offered up opposing views as doctrine. Congress also stated that "if the sample used is unrecognizeable then it does not consistute infringement (Sirois, 2006). The odd thing is that they determine this by "asking a lay listener." Perhaps the Court has never been to a nightclub where Girl Talk performs mixes of hundreds or thousands of samples combined into a new song, but if the court did they might rethink this idea. They also might rethink their opinion in Bridgeport that requiring individual licensing fees for every single sample would not stifle creativity because market forces would keep licensing fees reasonable (Ponte, 2006). Although obtaining one license might be reasonable, or even 5, but perhaps not 50 or a hundred individual licenses to make a two minute song. It is no wonder that today confusion and debates exist about the extent that copyright should grant protection over a work.

It is clear that music is protected under copyright law. However, it is unclear to what extent this protection covers. As the culture evolves over time, so does the mode of expression through which art is communicated. The idea of borrowing music explored in the cases above is no new concept. Musicians for centuries have been borrowing, learning and growing from each other, after all, there are only so many notes in a scale. Brahms borrowed from Beethoven, Beethoven borrowed from Bach and even "The Star Spangled Banner" was based off of an Old English hymn, "The Anacreaon in Heaven" (Sirois, 2006). And what would Jazz be if Duke Ellington, Count Basie, Miles Davis and Louis Armstrong did not interpolate, ie, play well known phrases of others during improvisation (Sirois, 2006)?

In order to understand why keeping copyrights protected through means such as DRM, it is important to understand what people are doing with copyrighted music. The history of sampling music recordings themselves (because remember, the recording and the musical composition may both hold copyrights) can be traced back to a radio broadcaster in France in 1948. Then a more contemporary method came from Disc Jockey's (DJs) in Jamaica who "dubbed" Jamaican records with non-Jamaican records (Sirois, 2006). Today, "using advanced digital equipment, a musician or sound engineer, can easily record, distort or manipulate the pitch, temp and tone of any piece of digital music before incorporating these bits and pieces into new music" (Ponte, 2006). This style is often used by rap and hip- hop artists. Supporters of this practice claim that sampling allows the artists to pay homage to past artists while "creating new musical expressions or ideas through transformative use of samples" (Ponte, 2006). An example of this which never made it to the Courts, but came to the public's attention was when artist Jay Z released his "Black Album" completely accapella. He encouraged his fans and artists alike to mix these vocals in new and creative ways. Brian Burton, also known as DJ Dangermouse, decided to do just that. Burton "blended" tracks from Jay Z's "Black Album" with beats, melodies and drums from the Beatles' "White Album" (Sirois, 2006). He made a few copies of this mix which he titled the "Grey Album" and distributed to some friends and local fans. The interent soon distributed it to the world and when it caught the attention of Rolling Stone Magazine, the attention of the copyright owner EMI soon followed (Sirois, 2006). EMI unsurpisingly submitted a cease and desist and DJ Dangermouse complied (as best he could, considering the album was already floating around cyberspace). "Downhill Battle," a music activist group, organized "Grey

Tuesday" a 24 hour marathon of sorts, encouraging websites and individuals to make the album available for downloading. If their reports are correct, 100,000 copies of the album were downloaded (Lim, 2004).

This example demonstrates what the copyright debate is all about. It exhibits art as defiance, art being the entity which copyright is meant to encourage. DJ Dangermouse did not make a profit off of those album downloads, but he created something that people wanted. This supports the argument that many proponents of looser restrictions for copyright because there are still other incentives, not so economically based, that should be kept in mind when conisdering how copyright laws should be applied in this digital world. However, if you are Emma Pike of the British recording industry you might argue that sampling like this allows for "a ragtag bunch of gleamers to claim that copying is creativity because they can't create anything without directly reusing copyrighted material" (Rimmer, 2007). Though working for the record companies, her stake in the matter is a unique one that is not necessarily represented by the society as a whole.

Music isn't the only thing that has had a turbulent history with copyright. Another important case setting the tone for the digital age was Sony Corporation of America v. Universal City Studios, Inc. 464 U.S. 417 (1984). This case occurred when movie studios sued Sony for making VCR's, claiming that because this allowed for recoding television they would be liable for any copying done by the users of the device. The Supreme Court described in the Opinion of Justice Stevens that "In order for there to be indirect liability, there must be direct infringement." The court argued that because most people reported copying in order to "time shift" material (ie, watch at a later date, one time and one time only) it was not infringement. The Court continued:

Even if it were deemed that home-use recoding of copyrighted material constituted infringement, the Betamax could still legally be used to record noncopyrighted material or material whose owners consented to the copyight. An injunction would deprive the public of the ability to use the Betamax for this . noninfringing off-the-air recording (Wolters Kluwer, 2007, p. 537).

This case is important because it juxtaposes the tone of the courts in the 80s to the aggressive enforcement policies of the RIAA in the 90s and 2000s. In his book "The Future of Ideas" Lawrence Lessig (2001) describes several stories where creativity was stifled or punished by big corporations who are so insistent on keeping every cent they can. In one story he wrote of Jesse Jordan, a college student who tinkered with a search engine and eventually made it easier to be able to share files with his fellow students. These files included everything from old notes, to pictures, to intellectual ideas about technology, anything that anyone wanted to share they could put in a special folder on their computer and share it (Lessig, 2001). Unfortunately for Jesse, students shared music files through this system as well (only about a third of what was being shared). Jesse was sued by the Recording Association of America for 15 million dollars in damages. He settled out of court for his entire savings of $12,000. He settled because he did not have the $250,000 it would take for years of litigation (Lessig, 2001).

Unlike the case with Jesse Jordan however, the Betamax case was between two big corporations who had the money to fight each other. Had Jordan's case made it to court, we may have seen a similar outcome. Afterall copymachines essentially do the same thing except with paper instead of video, would it be fair to not allow copy machines to be in libraries simply because it would allow people to possibly infringe on

the copyrights of the books within? Why would we restrict the public on everything, just to prevent some illegal behavior? This argument can be used to support a lack of control over the internet. Although the internet may be used as a catalyst for crime, that does not mean that the government should control it.

2. Introduction to Music Downloading and Filesharing

Before the Internet, sharing had to be done by sending physical copies of material, but now there are several ways to share files without ever touching it in a tangible form. An individual can send a file directly, through an email or even instant messaging service with just a few clicks.

One can also share files with the masses, without even knowing with whom they are sharng. In the late 1990s and early 2000s, the environment was primed for an increase in file sharing. Broadband penetration was steadily increasing in the United States, all anyone needed was an easy way to share (Peitz, 2006). This type of sharing first got the public's attention with Napster, a centralized file sharing network that allowed for people to "share" their files on the network while others were able to "borrow" these files and make a copy. Napster was soon sued by the RIAA and eventually bankrupted by this new business model as it was deemed illegal, on the grounds that it contributed to a loss of CD sales and a heightened barrier to entry in online distribution for music (Peitz, 2006). Before long, a new way to share files over the internet came along, this time a decentralized model "using an internet software application that links a series of individual computers, each of which capable of sharing, searching for, creating and modifying digital copies of particular files" (Danay, 2005). It was called peer-to-peer

(P2P) and has been referred to as "a giganticengine of [copyright] infringement" (Danay, 2005). One of the first and more successful sites to do this after Napster bankrupcy was Kazaa. Kazaa allowed for users to make available their music files for others to download, with a model that gave users access to even more available files (Peitz, 2006). Users could "search" for titles, artists or keywords and were given a list of files that others have offered to share that matched the search. Then users could choose to download these files, making a copy of the file on their computer.

The P2P model of file sharing required a significant amount of users in order to provide enough files to be useful, a phenomenon known as network effects. Often the files downloaded from P2P sites were poor quality, but despite these minor set backs it quickly grew into an extremely popular way to get music. Other similar methods of P2P file sharing soon arose, such as BitTorrents. Instead of having a server like Kazaa finding and dishing out files, BiTorrents are even more true to the P2P model because it is the users getting files from each other. Bits of files are willingly uploaded by torrent users instead of a server finding the files from shared folders on the users computer. Whichever the method, P2P file sharing was found to be an illegal act where there was no central database and the ability to copy from millions of computers from the comfort of your own home (Gervais, 2003). And this illegal act has become a cultural phenoman with millions of people using P2P, thousands of them at the price of getting sued by the Recording Industry Association of American, the RIAA (Electronic Frontier Foundation, 2008).

Music files are being illegally shared and often used to create new content. Sampling is one example of this and as discussed in the previous section, is cheap, easy

and accessible to the average consumer. This represents a significant change from the analog editing of the seventies that required cutting physical tape. After downloading and mixing music files, a consumer could then easily share this new work or the original with any one they please. They could utilize any number of methods be it through a P2P file sharing site, or by burning it to a CD and transferring a physical copy. Though it may seem like this open model of sharing and production can have a positive impact on creative works, all of this can easily be done with or without the user paying the creator of the original work-this lack of economic retribution provides the issue at hand. According to Steven Tepper and Eszter Hargittai "we can assume that there are positive benefits for artists, for audiences, and for the larger society, when people sample and explore new art" (Tepper, 2009). Even if individuals do not take widespread advantages of new technological capabilities yet, allowing for the possibility of discovering and producing new art can be beneficial to the society.

3. Literature Review

Lawrence Lessig addresses the Jesse Jordan case in The Future of Ideas as a way to introduce the question: should we be punished for tinkering? Should we be punished for trying to figure something out and learning, fixing, improving in the process? "While there's no doubt that your father had the right to tinker with the car engine, there's great doubt that your child will have the right to tinker with the images she finds all around. The law and, increasingly, technology interfere with a freedom that technology, and curiosity, would otherwise ensure" (Lessig, 2001, p.5). It is this

technology interference for which this paper is based. Copyright laws were established to encourage insightful creativity, not stifle it.

There has been much scholarly interest in the motivations of individuals knowingly breaking copyright law, such as those who engage in illegal file sharing over digital networks (P2P). According to Marc Fetscherin in "The Importance of Cultural and Risk Aspects in Music Piracy," there are two categories of current piracy research: one focusing on economic levels and the other with non-economic factors such as outside forces and cultural norms (Fetscherin, 2009). In the first category of studies (as cited by Fetscherin) Rapp and Rozek, 1990; Mansfield and Lee, 1996; Ginarte, 1997; Lee, 2000; and Maskus, 2001 found negative correlations between measures of a nation's income and its national piracy rate, meaning that nation's with lower income had higher rates of piracy. This can be complemented by studies done by Burke, 1996, and Silva and Ramello, 2000 [who] found that countries with higher levels of economic development exhibited lower overall levels of piracy" (Fetscherin, 2009 p. 2-3). Although these studies were correlative they do represent the idea that individuals will pirate because they do not have the money to buy the items as well as the possibility that pirated material is used as a source of income to those without other economic resources.

Research on non-economic factors contributing to music piracy includes pieces looking at cultural factors such as curiosity (Cheng, Sims, Teegen, 1997) and peer effects (Chiang and Assane, 2007). As Fetscherin discusses, these studies have found that curiosity can be a factor in an individual's willingness to pirate music, college students are influenced by their peers and there is a positive correlation between internet knowledge and an individual's tendency to pirate music. A study done by Fetscherin,

confirmed that risk is also a consideration when downloading music, if an individual feels that they will not be punished, they are more willing to download (Fetscherin, 2009). Although scholarly research in the area of illegal downloading is broad, there has been little done to gauge how Digital Rights Management is affecting illegal file sharing habits of individuals. Because college students have significantly greater access to and knowledge of the internet than the overall population, and because so many studies of this nature have already targeted this age range (such as those done by Fetscherin, 2009, as well as others he discusses such as; Swinyard, Rinne, and Kau 1990; Cheng, et al 1997; Gopal and Sanders 1998; Holm 2003; Bhattacharjee et al. 2006; and Chiang and Assane, 2007), this study will also focus on college aged individuals. Therefore, this study will concentrate on gauging the effectiveness of DRM as well as confirming some of the findings of previous researchers.

It should be stated that although DRM is a specific deterrent to music piracy, there are also many alternatives to stealing online music. There are places to legally purchase music online, such as iTunes. Music streaming is an option with sites ranging from Pandora to local radio stations streaming their live broadcasts, which allow free access to streaming music with support of advertising sales, while not providing digital downloadable files to the user. There are even social networking sites such as blip.fm and last.fm which incorporate legal music sharing with social interaction. A recent decline in piracy may be due to a rise in sites like these, not an effective DRM campaign.

4. Overview of Digital Rights Management Technology

4.1 Introduction to DRM

Before internet music file sharing became popular, the most common way to get personal copies of music was to purchase them from music stores. Record companies record artists, put the recordings on a CD and distributed them to the stores who would then sell the music for a profit. There is high fixed cost with this method and it is statistically considered a risky business, because of the very few CDs that become extremely popular compared to all that are made and distributed (Peitz, 2006). A large decline in record sales was seen in 2000, coincidently within the period of the creation of Napster and other music file sharing websites (Peitz, 2006).

There are several possible explanations for this decline, including a poor economy and other forms of entertainment such as digital versatile discs (DVDs) and computer games gaining an increased popularity; nonetheless it was easy and made sense to point a finger at file sharing. The record companies were the first to do this. Their retaliation tactic did not include changing their business model, but instead suing everyone from websites to individuals who downloaded music. This did not stop the growth of music distribution on the internet. When it became clear that the internet was going to be a popular place for consumers to get their music and that the illegal streams were the only options available, it was only a matter of time before sites sprouted up offering legitimate ways to download music. These sites ranged from iTunes, the most popular music selling site in America, to sites like Ruckus who contracted with universities to offer music to college students. iTunes and eMusic have become profitable with their business model of

selling music by the song. Pandora is an online radio station that provides songs based on the user's likes, by streaming songs that are similar in taste and are able to make money off of advertising. This type of site is able to circumvent the problem of music pirating by not allowing actual files of the songs to be saved by the individual user. Music selling sites like iTunes and eMusic do not have this luxury. If the music files from these sites were just like any other file, after initially downloading a file it would still be quite simple for the user to turn around and remix it, or simply put the file right back up on a P2P site for others to illegally copy.

As a way to combat this, technology commonly thought of as DRM is often added to music files to prevent users from sharing or editing the file. After all, if illegally sharing music is a social norm and not thought to be very risky by the public, a technological solution seemed to be the best way to impede the phenomenon. Although DRM has been defined several different ways, for the purposes of this study it will be defined as "a set of technologies and systems that can collectively support the entire life cycle of content - creation, manipulation, distribution and consumptions - by preventing copying, imposing fees, processing payments, tracking contents, and protecting each principles rights and profit" (Lee, 2003). This technology is used on digital files as well as on tangible CDs, DVDs, and the like. It can take many forms ranging from digital water marks to digital certificates to encryption. There has yet to be an industry standard established, but the end result is that a restraint is put directly onto files, in order to restrict what can be done with the file. Generally DRM is a combination of watermarking, fingerprinting, copy control, authentication, and access control.

Watermarking is when a digital identification is inserted in the file and fingerprinting converts the files content into a unique identification number (Peitz, 2006).

In practice, iTunes uses DRM technology to require that the files downloaded from the site can only be accessed after verifying a user-name and password as well as that the files can only be transferred to a limited number of other devices. An underlying theoretical problem with this, however, is that copyright law does not restrict the user's right to copy as long as that copy is only used as a backup to the original file and allows for "fair use". DRM restricts users beyond these rights, many times not affording users to create a backup copy or do much with the file at all, even if it is within the legal realm. The reliability and effectiveness of DRM technology has also been brought into question. Although the goal of DRM is to restrain users from making and sharing copies of files, it is still being done by many, especially college-aged students.

The study that was done as part of this thesis aims to look at not only the attitudes of students toward DRM, but also seeks to discover how effective this technology actually is at deterring illegal file sharing. In 1998, Congress passed the Digital Millennium Copyright Act (DMCA) criminalizing "production and dissemination of technology, devices or services intended to circumvent DRM technology" (Peitz, 2006). This act allowed for DRM to gain power in the courts, making it clearly illegal to evade it. It is important to recognize that the DMCA, although related to the Copyright Act theoretically, is considered a different law. Therefore, one can be found to be liable for circumventing DMCA technology, even if they were not infringing on copyrighted material. So even if a person could claim "fair use" on a copyright claim, if they stripped the DRM technology they could still be found liable of violating the DMCA. Congress

was worried that this would give too much power to the DRM technology, so they instructed the Copyright Office, founded in 1897, to create exemptions to the rule. However, the Copyright Office has at least so far, taken a conservative approach and only allowed for two exemptions: for literary works whose storage formats have malfunctioned or become obsolete, and lists of filtering criteria (Wolters Kluwer, 2007).

Despite this, a web search for "how to circumvent DRM" will find several "how to" guides, programs and detailed advice on sites, blogs and forums. It is easy to see that it is not only quick, but fairly easy to strip DRM from all sorts of files, including those from iTunes. It is also possible to simply make a playlist on iTunes music player with DRM enabled songs, burn a CD, then re-upload the files. The end result is DRM free files, of slightly lesser quality. With all of these possibilities, the question remains, is DRM effective in keeping users from illegally downloading, mixing and sharing files? Or is DRM not only ineffective at keeping users from illegally using their music files, but in fact deterring users who would buy legal files from sites? An example of this would be if someone chose not to download legally from a site such as iTunes because of the hassle the DRM causes to do things within the realm of what is legal, such as making a backup copy of the file.

4.2 DRM in an Applied Setting

Downloading music from P2P sharing sites has downsides. As discussed previously, it is illegal, but there are other negative factors. For one, it can be time consuming. Sure, it may not take long to search for a song, but it can be time consuming to download a song of high quality. The quality is never guaranteed and often reduced;

many times files are not what they were labeled, incomplete, or poorly compressed (Peitz, 2006). Plus, Internet Service Providers (ISPs) often limit how much can be downloaded and there is a risk of downloading viruses, worms or other programs that may be damaging to your computer (Peitz, 2006). Yet, people still frequently prefer downloading digital files of songs to buying an entire CD. This makes for a prime market to be tapped by companies who would legally offer safe, high quality music for a decent price.

The iTunes Store (originally iTunes Music Store) has become one of the most successful online distributers of music files to do this, selling over 6 billion songs since its launch in 2003. The majority of these songs have been sold equipped with DRM software limiting what some may call the "usefulness" of the files. Originally every song was priced at 99 cents and each song was limited protected with DRM. These files could be burned to a playlist up to seven times and transferred to five computers, after authentication (Peitz, 2006). However, at the beginning of 2009 the iTunes Store announced that they would revamp their business model. Apple is currently shifting to a DRM free, three tiered pricing system where the prices for music files will be $0.69, $0.99 or $1.29, reserving the most expensive price for files not equipped with DRM technology. According to sources such as the New York Times (Arango, 2009) this change was the result of several discussions with record companies. Record companies wanted to keep a strong hold on their music files through DRM technology, but gave this up in order to establish a tiered pricing where they could charge more for new and popular tracks.

Whether or not individuals are willing to pay an extra $0.30 for music files that are not restricted has yet to be seen because the prices are only now shifting, however this will most likely help the iTunes Store stay competitive against the newer Amazon MP3, which has offered DRM free music since its inception. iTunes will be charging more for these DRM free files than Amazon MP3, so next quarter's numbers should offer some interesting data on the willingness of users to pay for DRM free files. iTunes also exemplifies an interesting business model that may prove to be more financially lucrative than the traditional record company model. The distribution costs are extremely low, which allows for iTunes to utilize the positive aspects of the "long tail". The long tail refers to the idea that it is possible to provide less popular items without more cost. In a brick and mortar store, having a a less popular item provides a risk, because if it is not sold then the store will experience a loss. With internet stores, the items can all be housed in large warehouse where they can sit without much cost until someone wants to purchase it. This means, they can offer obscure and niche market files without much cost to them, whereas a brick and mortar store would be less inclined to do so because it would take up space without possibly ever getting sold. This all leads to the internet as one of the most profitable ways to distribute music, but the question still remains: what does this all mean for DRM technology? One of the few effective businesses actually employing DRM, iTunes, is now moving away from it. Does this mean that DRM is accepting defeat? If so, what does this mean for trying to enforce copyright laws? The availability of DRM-free music has the possibility of undermining copyright law, despite being aligned legally with it.

Already companies such as Ruckus who utilized DRM technology have gone out of business, Ruckus being a recent example closing down February 6th, 2009. However, it is impossible to say if it was the DRM that did them in, or other aspects of their business model. For example, Ruckus contracted with universities to offer legal, DRM protected music to anyone with a university user ID, and universities paid for this service. This seemed like an ideal system: universities could stop worrying that their students would be charged with copyright infringement by downloading illegal files while using university servers and students could get the music they desired while Ruckus would be paid for giving it to them. Unfortunately, this was not an effective revenue making plan, and Ruckus went out of business in early 2009. This could have been because universities did not see a decline in their students illegally downloading music, or perhaps the students just didn't use the system because they did not like the selection or just stripped the DRM anyway, or perhaps it was just another failure due to the falling economy. However, it seems that as long as DRM is simple to circumvent, it is a losing battle for the record companies and those selling music files to try and stop it. Perhaps iTunes is on the right track by acknowledging that if people want to illegally share music files, they will. Their market should include people who don't want to download illegally but instead desire a safer, legal, higher quality product.

5. Research Questions

As stated previously, the question this thesis aims to answer is if DRM technology is enough to change human activity (i.e. if students want to do something like illegally share music files, will technology be able to stop it)? It is hypothesized that DRM will

not be effective at deterring students from illegally downloading or sharing music files if these acts are thought be a social norm. This will be addressed by the following research questions:

Research Question 1a – What are some student's attitudes toward the legality of sharing music files?

Research Question 1b – What are some student's attitudes toward the morality of sharing music files?

Research Question 2- What are the current attitudes of students about DRM for music files?

Research Question 3- How effective is DRM at actually deterring students from sharing music files (where effective is defined when students choose to download legally and not share files over illegal alternatives)?

6. Methods

To answer the questions posed above, a survey was given to a convenience sample of undergraduates at Michigan State University. College aged students were chosen because they represent a significant population of those currently downloading music (Peitz, 2006). They also have been found to be more likely to download music from P2P file sharing sources because of their general lack of income and availability of time (Peitz, 2006). The students surveyed were all enrolled in introductory courses in the Department of Telecommunication, Information Studies and Media. If the students participated in the study they were given extra credit, however they were able to not

participate in the study and get extra credit another way. There were 337 students given the opportunity to do the study, 197 enrolled in TC 100 and 140 enrolled in TC 201. A check of email addresses was conducted (not in association with answers) to make sure there was no dual enrollment issues between the courses.

The survey was posted online, using the commercial hosting site Zoomerang.com. Survey questions are included in Appendix A. The survey was completely anonymous in order for the participants to feel comfortable, given that the survey was asking questions related to illegal music file sharing, downloading and DRM stripping. Of the 337 students invited to participate in the survey, there were 202 surveys completed for a 60% response rate.

Demographic information can be found in Table 1 and it should be noted that although several majors were declared by the respondents, Media and Technology was predominant because of the sampling method used.

Gender	
Male	75%
Female	25%
Ethnicity	
European American	63%
African American	14%
Other	23%

Table 1: Demographic Data

7. Results

Table 2 below reports rankings of frequency, where 1=Never, 2=Rarely, 3=Sometimes, 4=Somewhat often and 5= Very often. Consequently, lower scores indicate less reported frequency of the behavior in question.

Question	Mean	Std. Dev.
How often do you illegally download music from the internet?	2.79	1.20
How often do you download music from legal music sites (such as iTunes or the former Ruckus)?	2.28	1.22
How often do you strip, avoid or work around DRM technology from legally downloaded music?	2.02	1.17
How often do you receive music files through music sharing sites such as BitTorrents?	2.38	1.29
How often do your friends illegally download music?	3.77	1.02
How often has DRM stopped you from sharing music files that you wanted to share?	1.93	0.95
Have you ever refrained from legally purchasing music files because it was coded with DRM technology?	2.02	1.28

Table 2: Frequency of copyright behaviors

In addition, respondents were asked for their opinions about copyright and DRM. Table 3 reports Likert scale ratings ranging from 1 "Strongly Disagree" to 5 "Strongly Agree". Consequently, higher means indicate more agreement with the statement.

Question	Mean	Std. Dev.
It should be legal to strip DRM.	3.12	1.01
DRM is an effective way of protecting copyright protected music.	2.68	1.09
My friends all share music without worrying about copyright issues.	3.97	0.97
Music file sharing should be illegal.	2.33	1.07
It is socially acceptable to illegally download music.	3.92	0.95
I feel it's my moral obligation to abide by copyright laws.	2.84	1.03
It is socially acceptable to share legally purchased music files.	4.19	0.87
DRM technology is challenging to circumvent.	2.90	0.93

Table 3: Sentiments towards copyright and DRM

Finally, Spearman's correlations were conducted on these variables to determine relationships between variables. A full correlation table is presented in Appendix 1.**Research Question 1 (A and B)**

Research question 1A (How do students feel about the legality of sharing music files?) and 1B (How do students feel about the morality of sharing music files?) sought to gain perspective on how students felt about both the legality and morality of sharing music files. As was expected, a low average of respondents, only 2.33, agreed that music

file sharing should be illegal. Similarly, a high average of respondents, 3.93 (with only a .943 standard deviation), agreed that it is socially acceptable to download music, with 76 percent of respondents who either strongly or somewhat agreed that it is socially acceptable to participate in illegal file sharing. Even more convincing data that it is an acceptable social norm to share digital music files, is the high average of respondents who agreed that it is socially acceptable to share music that was legally downloaded (4.19) along with the high average of respondents who agreed that their friends share music without worrying about copyright issues (4.02).

The correlative statistics (using Spearman's rho to account for non-continuous variables) also support the hypothesis that people who did not agree with the moral basis of copyright law or think it is socially acceptable, would be willing to break this law by downloading illegally or sharing music files. There is a positive correlation between those who downloaded illegally and who believe their friends had downloaded illegally ($r=.35$, $p<.01$). It can be inferred that because respondents felt that their friends downloaded music illegally, they were also inclined to do so. The negative correlation between those who downloaded music files illegally and those who think music sharing should be illegal ($r=-.19$, $p<.01$), also supports this principle. Similarly, there is a negative correlation between those who downloaded music illegally and those who felt a moral obligation to abide by copyright law ($r=-.30$, $p<.01$), meaning that those who downloaded illegally did not feel a moral obligation toward obeying copyright law. Additionally, there is not a significant correlation between those who downloaded music legally and those who felt they had a moral obligation to abide by copyright laws ($r=0.10$), which may provide an argument that although those who download illegally did

not feel they had a moral obligation to abide by copyright law, neither do those who downloaded legally, again supporting the idea that it is socially acceptable to illegally download music.

The correlations also offer some interesting information about the perspectives of the respondents with concerns to the legal issue of illegally downloading or sharing music files. This insight can be found not from the positive or negative correlations, but by the lack thereof. There was no significant correlation between those respondents who illegally downloaded music files and those who thought it should be illegal to download music, suggesting that respondents who are downloading illegally do not seem to care about the legality of music file sharing, one way or another. They simply download no matter what. Of course, as was stated previously, a very low average (2.33) of respondents, agreed that music downloading should be illegal in the first place. This is also supported in the open ended question, where the respondents were asked about their thoughts on DRM. One respondent claims that DRM is "stupid [because] music should be for everyone!" This sentiment seems to be shared with other respondents who present the argument that because record companies reap the benefits of music sales, not the original artists, that "DRM prevents a bad industry, not a crime." It can be inferred from the data that college aged, Michigan State undergraduate telecommunication students generally do not believe that sharing music files should be considered illegal. They also tend to think that it is socially acceptable despite the law saying otherwise, supporting the idea that music downloading has become a social norm.

Research Question 2 (What are the current attitudes of students about DRM for music files?)

The first research question only addressed music file sharing in general, not DRM. Research question number two aimed to gauge attitudes of Michigan State undergraduates about DRM on music files. An extremely low average amount of users agreed that DRM has stopped them from sharing files which they want to share, (1.98) with 75 percent of respondents answering that it never or rarely stopped them. Some positive news for the recording industry is that DRM also did not seem to deter respondents from legally purchasing music, only an average of 2.03 agreed that it has, with over half of them claiming the most drastic response of "never." However, those who purchased files legally are positively correlated with those who thought that stripping DRM should be legal, meaning that even though DRM has not stopped them from buying, they did have negative thoughts about DRM and would like to be able to remove it from their files. Another low average of respondents, 2.90, believed that DRM is challenging to circumvent and it appears that overall the Michigan State undergraduates surveyed are not overly bothered by DRM technology. There was a slight gender bias in feelings towards DRM. Men (2.19) were more likely than women (1.51) to report that they circumvented DRM ($t=3.63$, $p<.001$) and that they use services like BitTorrent to download files (men 2.57, women 1.84; $t=3.55$, $p<.001$). Men were also less likely to agree that DRM was challenging to circumvent compared to women (2.82 vs. 3.20 ;$t=-2.57$, $p<.01$).

Several of the open ended respondents claimed that "DRM is a simple hurdle that will only stop a few people. With advancements in the information accessible through the internet anyone can find a way around this obstacle." Even those who believe that it is immoral to download music illegally seemed to be bothered by DRM. One respondent

made the argument: "On a moral basis, I believe people should pay for music. However, once I've paid, I should be able to do with it what I want. It should be mine. I paid for it. DRM denies me this right. That is why I am against it. It's like I'm renting a song even though I paid full price for it. On a technological level, I'm against it because if the DRM issuer's servers go down or their service is no longer supported, I can't play their music and I'm out of the money I spent on it. Either way you look at it, it's bad for the consumer." This could explain the negative correlation between those who download music legally and those who think DRM is challenging to circumvent and with those who believe DRM is effective. It can be inferred that often even those who think it is morally wrong to steal music, do not think DRM is a fair way to prevent this and that "DRM only hurts honest people. I've only stripped DRM for my own purposes, not to share it illegally."

Research Question 3 (How effective is DRM at actually deterring students from sharing music files)

One interesting finding is that the students were split across the board as to whether or not they thought DRM was actually effective, but overall was a low average of those who agreed that is was effective (mean=2.69, std. dev.= 1.11). This leads to the last research question, which considered if DRM is in fact effective, where effectiveness is defined by individuals choosing to practice legal internet music practices, downloading from legal sites and not sharing their files. Interestingly, there was no significant correlation between those who downloaded music legally and those who stripped DRM. One would expect that if DRM was effective, then those who download legally would be

negatively correlated with those who strip DRM. Though, this lack of correlation does not offer significant proof that DRM is ineffective, it also does not show that it is effective. However the fact that of all the averages, the lowest is the one that asks if DRM has stopped the respondent from sharing music when they wanted, would lend to the belief that DRM is not effective. This clearly supports the hypothesis that if an individual wants to illegally share, DRM will not stop them.

8. Limitations

There are two major sources of potential error introduced by this study. First, by using a convenience sample, it limits our ability to generalize to the population of college students. Additionally, focusing on students in media courses is likely to create a bias towards more technologically savvy students, enhancing their knowledge of copyright and DRM.

In addition, the survey method has well known limitations. First, this research is only collecting data on people's beliefs about what they did, not necessarily their actual behavior. Given that this research is asking about illegitimate behavior (illegal downloading), it could be that respondents are under-reporting their actual behavior, though the relatively high scores on those behaviors indicates that they were not affected by this trend.

9. Discussion

The findings of this research raise several interesting questions about DRM technology. The respondents have said that DRM has not affected their likeliness to buy

legal music, but the findings also show that DRM is not doing much good in terms of preventing individuals from doing what they want to do. It is clear that the college aged generation is not deterred by copyright law from continuing to illegally share and download music files. They do not seem to believe that it should be illegal to share files and therefore if they decide they want to share a file they will with or without DRM technology. If this means getting files without DRM or getting files with it and stripping the DRM, it doesn't matter. It can be said that technology can change the world, and this is true. With the large scope of things, the internet has changed the way we do business, entertainment and life in general. The overall way we look at copyright has shifted. However, creating technologies to try and manipulate actions when they do not agree with this shift will often be unsuccessful. iTunes is seeing that currently as they move away from a DRM model.

This is not to say that DRM is completely useless. Many people respect DRM technology, like one respondent who said "I believe the Digital Rights Management is a good technology for helping musicians and other media retailers and distributes gain the money they deserve." Whether or not DRM is useful can be determined in how we define failure. If we take a loose interpretation of effectiveness, meaning that if DRM stops some people then it is successful, then DRM technology could easily be considered successful. DRM will stop some people from sharing digital music files. However, with anti-copyright movements moving toward the social norm, it is clear that the number of people DRM technology will stop is not enough to keep the population overall, at least not the young population, from stealing and sharing digital music files. Policy makers need to consider this when trying to create policy to enforce copyright protection. Policy

has been sprouting up trying to enforce the current copyright ideals and to support technologies that help keep those ideals. Perhaps instead of enforcing the current way the legal field conceptualizes copyright, instead the legal field needs to reassess what copyright protection should enable the owner of the copyright to do with that protection.

Although there have been many studies concentrating on music file sharing, this thesis aims to bring some insight into the effectiveness of the specific deterrent to music file sharing and copyright infringement: DRM. On a larger scale, it gives us insight to the overall apathy of the college aged generation at Michigan State. This study provided several opportunities to infer conclusions of indifference toward copyright law from the research sample. Moral obligations didn't seem to deter them from copyright infringement, nor did it sway them toward legally downloading music. They also didn't have much interest in the legality aspect of downloading music. Although many of the respondents did take the time to voice their opinion for or against DRM in the open ended section, it can be inferred through the Likert scale questions that there is a serious lack of concern about the issue from the respondents. This could be the most important finding of the study, to confirm that the view of copyright law and how it should affect society is not a concern of this group and perhaps that could be the reason why copyright infringement is running so wild.

Future research should consider if technical solutions are really the logical answer to this issue or if perhaps finding new ways to make the laws fit the social norm might be valuable. Future research should also consider business models such as free streaming (supported by advertising) and DRM free music sales as effective ways to move the flow of consumption toward legally ascertaining digital music. In future studies it could be

worthwhile to see if copyright is actually giving more incentive to create than not. This could be done by looking at the movements such as the one led my Dr. Lawrence Lessig toward the idea of creative commons. This initiative sets to allow artists to choose the amount of protection they want to enforce on their copyright, often allowing for looser interpretations of the protection so others can utilize the work and create new works from it. It would be worthwhile to see if this form is just as effective in incentivizing creation as the current copyright laws. If it is, then perhaps policy should follow to support a more lenient copyright model, or music companies and musicians alike, should embrace the way in which Creative Commons works within the Copyright Law to allow more leniency from the copyright holder.

Table 4 Survey Results

	Question 6: How often do you illegally download music from the internet?	Question 7: How often do you download music from legal music sites (such as iTunes or the former Ruckus)?	Question 8: How often do you strip, avoid or work around DRM technology from legally downloaded music?	Question 9: How often do you receive music files through music sharing sites such as BitTorrents?
Valid	199	200	200	200
Missing	3	2	2	2
Mean	2.77	2.28	2.02	2.38
Median	3.00	2.00	2.00	2.00
Mode	2	1	1	1
Std. Deviation	1.191	1.216	1.178	1.286

Table 4 Continued

	Question 11: How often do your friends illegally download music?	Question 12: It should be legal to strip DRM.	Question 13: DRM is an effective way of protecting copyright protected music.	Question 14: My friends all share music without worrying about copyright issues.
Valid	200	199	200	195
Missing	2	3	2	7
Mean	3.80	3.13	2.69	4.02
Median	4.00	3.00	3.00	4.00
Mode	4	3	3	4
Std. Deviation	1.012	1.017	1.105	.928

Table 4 Continued

	Question 15: Music file sharing should be illegal.	Question 16: It is socially acceptable to illegally download music.	Question 17: I feel it is my moral obligation to abide by copyright laws.	Question 18: It is socially acceptable to share legally purchased music files.
Valid	198	199	199	196
Missing	4	3	3	6
Mean	2.33	3.93	2.84	4.19
Median	2.00	4.00	3.00	4.00
Mode	2	4	3	5
Std. Deviation	1.095	.943	1.032	.879

Table 4 Continued

	Question 19: DRM technology is challenging to circumvent.	Question 20: How often has DRM stopped you from sharing music files that you wanted to share?	Question 21: Have you ever refrained from legally purchasing music files because it was coded with DRM technology?
Valid	198	197	197
Missing	4	5	5
Mean	2.90	1.98	2.03
Median	3.00	2.00	1.00
Mode	3	1	1
Std. Deviation	.932	1.005	1.303

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