

Evolution of Pinball Machines and the Time That America Outlawed Pinball

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

For my fourth-year undergraduate technical capstone project, I worked on the design and manufacturing of a University of Virginia (UVA) themed pinball machine. While working on this project, I was curious as to how I would approach the STS portion of my thesis. After some initial research, I learned that pinball was banned throughout the United States in much of the latter half of the 20th century and I discovered a rabbit hole of pinball history and legislation. After this initial research, I sought to understand how the game of pinball, which was seemingly unimportant to political issues, was banned. Accordingly, my paper will present the culmination of research into the engineering design choices and political factors that led to the banning of pinball, the changes in the design of the pinball throughout the ban, and a direct examination of the banning of pinball in New York City from 1942 to 1976.

This particular case study is an important one because it provides a specific example on how design choices directly influenced the perception of pinball in the eyes of the public, especially including lawmakers and government officials. The fundamental design changes in pinball during the timeframe of this case study shifted pinball from a game characteristic of juvenile delinquency to the fun and competitive arcade game that it is today. In this paper, I argue that pinball experienced a shift from a game of complete chance to a game of mostly skill because expertise emerged in developments of pinball resulting in the eventual lifting of pinball bans.

First, I will provide an overview of literature on the structure of games with the balancing of luck and skill, the history of gambling and gambling laws in the US, and the legal definition and interpretations of skill. This literature will provide important context for understanding the

broader issue of the lines society draws between gambling and skill games and their application to pinball. It will also provide insight into why many games feature a combination of luck and skill and how the combination complicates the classification of games. Then, I will analyze primary and secondary academic journal articles examining the history of pinball to conduct a historical analysis and case study analysis of the progression of the designs of pinball machines and the 1942-1976 ban of pinball in New York City. Through this analysis, I find that certain features were invented and incorporated into machines that prioritized player skill. I will also find that early pinball machines were designed for gambling purposes and, along with other political factors, gave the game a seedy reputation and led to the enactment of the New York City ban. Lastly, my analysis will highlight the role of pinball designers and manufacturers as experts responsible for the changes in pinball and its perceptions as well as the role of talented pinball players who were instrumental in the lifting of the ban. Finally, I will end with a discussion of the implications, limitations, and potential practical implications of my research. This discussion will explore how my findings may inform future policies and what I hope my research will inspire among readers of this paper.

Literature Review

Many tabletop games, electronic games, arcade games, and video games are designed and engineered to captivate players and keep them playing. Rewarding the player and balancing skill and chance are key considerations of game design. Gambling machines take player captivation to an extreme and can cause cases of addiction. According to cognitive-behavior theories of addiction, all games of chance, indeed all things that are exciting or pleasant, or provide an escape, are potentially addictive (Turner & Horbay, 2004). Furthermore, the addictive nature of gambling machines not only poses risks to individuals but also raises concerns about the societal

impact of encouraging addictive behaviors through gaming. Games that blend skill and chance are prevalent because they attract both inexperienced players and seasoned players with high skill. This is because these games allow “skill to influence the outcome without predetermining it” and allow “less skillful players to compete while knowing they have at least a chance for success and makes a win more significant than if it were simply a chance outcome” (Smith & Abt, 1984, p. 125). Moreover, the inclusion of both skill and chance in games fosters a sense of engagement and satisfaction for players, enhancing the overall gaming experience and promoting longer-lasting enjoyment.

The history of gambling laws and regulations in the US influence how games of chance are perceived. Anti-gambling legislation began in the United States as early as the late 1700s but ramped up with the emergence of gambling machines like slot machines and early pinball machines. By 1908 horse racing was banned and gambling houses were outlawed in most states. In the early 20th century, gambling faced a series of bans and re-legalizations in different states, but by the 1950s gaming control laws were passed in nearly every state (Fenich, 1996). This complicated history of gambling legislation in the United States created a poor reputation for any game even loosely associated with gambling. Pinball was an example of a game with a negative reputation that persisted for an unusually prolonged period of time: “An aura of deviance surrounded pinball and the settings in which it is played... its participants were cast as loiterers ‘up to no good’” (Conn, 1981, p. 1).

Understanding the distinction drawn by the laws between skill and luck in games is crucial for comprehending their public perception and provides essential context for examining the case study of pinball. According to US law, the legal definition for skill is:

A presence of the following factors, alone or in combination with one another: 1) A learned power of doing a thing competently, 2) A particular craft, art, ability, strategy, or tactic, 3) A developed or acquired aptitude or ability, 4) A coordinated set of actions, including, but not limited to, eye-hand coordination, 5) Dexterity, fluency, or coordination in the execution of learned physical or mental tasks or both, 6) Technical proficiency or expertise, 7) Development or implementation of strategy or tactics in order to achieve a goal, 8) Knowledge of the means or methods of accomplishing a task (Yampolskiy, 2007, p. 308).

Pinball is an example of a game of skill according to this definition, but it was not always. In its early years pinball machines were based solely on chance. However, the design of pinball machines progressed towards the game of skill that it is today, making it an important case study to analyze. Other interpretations of skill in law break it down that “video games of skill and mechanical amusement devices are skill-based devices, but machines which dispense cash, items redeemable for cash, or gift cards are defined as ‘cash devices’” (Cornett, 2023, p. 5). This interpretation is also important to pinball because there existed pinball machines that dispensed money as well as machines that awarded prizes to be cashed out.

I use Carolyn Marvin’s “Inventing the Expert” as a theoretical framework. According to Marvin, a new class of experts with specialized knowledge in electrical engineering rose in the late 19th century. These experts had a technological literacy that became a form of social currency, causing them to play a crucial role in shaping public perceptions and understanding of new technologies (Marvin, 1988). A key concept is the characterization of insiders and outsiders. Insiders are the experts possessing specialized knowledge whereas the outsiders lack this knowledge and rely on insiders to interpret or explain technological innovations (Marvin, 1988).

I use this framework to analyze how expertise played a crucial role in the development of pinball starting as early as the mid-1930s and continuing through the 1970s. I analyze how the expertise of pinball manufactures contributed to the game's evolution from a game of complete chance to a competitive game of skill. I also analyze how the expertise of skilled pinball players led to the lifting of pinball's ban. Finally, I use Marvin's concepts of insiders and outsiders in my analysis to argue that pinball manufacturers played the role of insiders during pinball's early years until the emergence of skilled pinball players who joined manufactures as insiders. I argue that government and city officials played the role of outsiders during pinball's 1942-1976 ban in New York City.

Methods

Because the analysis of the history of pinball design advances and how they tie into pinball legislation is relatively novel, I used mainly secondary sources for my research through a historical analysis and a case study analysis of pinball's ban in New York City. I focused on academic journal articles examining pinball, its ban, and its changes in design in the 20th century. In my review of this literature, I examined what political and social factors were considered in documenting and analyzing the case study of pinball's 1942-1976 ban in New York City.

Analysis

A Brief History of Pinball

For context in this analysis, electronic pinball originated from the tabletop game of bagatelle in the 1930s (Ruben, 2017). Bagatelle was a game in which small balls were hit and

then allowed to roll down a sloping board with holes, each numbered with the score achieved if a ball goes into it. The game featured wooden pins as obstacles for the ball. From the 1930s until 1947, pinball machines were electronic versions of bagatelle in which players, aside from launching the ball via a plunger (a spring loaded rod) the ball to start the game, had no impact on the score of the game, making it a game of complete chance. Many of these machines were exploited by manufacturers to encourage monetary gambling. This persisted until around 1947 when flippers (the levers typically found at the bottom of pinball machines that are used to keep the ball in play) were invented (Black, 2012). The invention of flippers spurred the introduction of other features, mainly implemented in the 1950s through the 1980s, such as drop targets in 1962 that emphasized player skill causing a shift in the nature of the game (Bellis, 2019).

Early Pinball Machines as Gambling Devices

Early pinball machines (from the early 1930s when pinball was invented and continuing in some cases through the 1960s) quickly became perceived by city and government officials as gambling devices rather than “for amusement only” devices. The first notable example of early pinball machines being constructed into gambling devices was in 1933 when the “pay-out” pinball machine was introduced. These machines gave out money or tokens when the ball landed in predetermined holes on the playfield. Also, these machines only incorporated one ball per turn as opposed to the standard of five balls from earlier games (Black, 2012). The choice to reduce the number of balls from five to one, along with the blatant parallels to a slot machine, such as dispensing money after the ball lands into a specific hole, actively encouraged players to spend more money to play extra games in hopes of winning a “pay out.”

Pinball manufacturers played a direct role in the game's development for gambling implementations. By the mid-1930s and the 1940s, Chicago (a hotbed area of pinball manufacturing) had both "for amusement" manufacturers and gambling manufacturers (King, 1966). During these years, pinball manufacturers had total control of what direction pinball would take. Gambling manufacturers were much more successful, so gambling pinball machines dominated the market (King, 1966). The complete control that manufacturers had in the early years of pinball made them "insiders," as their expertise directly resulted in the pronounced development of gambling pinball machines as well as having a role in how these machines would be applied and where they would be used. Contrastingly, pinball players played the role of "outsiders" during this early era of pinball. This is because players had no control over their score in the game (besides paying to play more).

One example where gambling manufactures used their influence and expertise as "insiders" was with the development of the feature of cashing out game replays. From the 1930s to the mid-1960s, both amusement and gambling pinball machines awarded game replays after players achieved a certain score or met a certain condition. For gambling machines, a larger number of replays could be won (99 max) and replays could be "cashed out" for a monetary prize and removed from the game using a hidden "knock off button." These machines also featured hidden counters inside the machine which kept track of coins inserted, replays won, and replays removed. The counters were present to hide the illegal aspects of the game when law enforcement officers were present as well as to prevent lying between players, store owners, and businesses leasing pinball machines (Bilek & Ganz, 1965). Here, pinball designers and manufacturers used their expertise to develop pinball machines with gambling features that could easily be hidden. These machines also required store owners leasing the machines to have a

degree of expertise in how these contraptions worked. The blatant intention of manufacturers to conceal gambling features contributed to the negative perception of the game in its early years.

Evolution of Pinball Towards a Game of Skill

Throughout the history of pinball machines, features rewarding player skill were added to remove the stigma of pinball machines being seen as gambling devices. As the last section pointed out, the early years of pinball (1930s and early to mid-1940s) were a time in which gambling pinball machines dominated the market. Nevertheless, one notable change in the game which rewarded player skill was the “coin chute” which was introduced in 1935. The “coin chute” was invented by a Chicago pinball company which allowed players who achieved a certain score to play another game without inserting another coin (King, 1966). At first, machines with this feature were based on play by chance but this feature was eventually applied on machines that emphasized skill (Ruben, 2017). Accordingly, this was the first notable addition to pinball that established the groundwork to begin the shift towards an emphasis on player skill. The introduction of the “coin chute” also began to show that pinball manufacturers could use their role as “insiders” to fundamentally change the game. Though it was a step in the right direction to shift the game to one of skill, players still had a lack of control over their scores.

In 1947, the most pivotal advancement in the progression of pinball towards a game of skill occurred with the invention of flippers (Black, 2012). Today, flippers are the most iconic aspects of pinball machines and are incorporated into nearly every pinball machine manufactured since 1947. The classic setup features two flippers at the bottom of the machine which the player can use strategically to prevent the ball from draining. Not only did the addition of flippers directly change the game, but it also led to the addition of other features that rewarded player

skill as well as the changing of existing features to emphasize skill. Moreover, the introduction of flippers began a rise in skilled pinball players as “insiders” which would later be instrumental in the eventual lifting of the ban of pinball.

One key example of a skill-based feature implemented after flippers was the 1962 invention of drop targets by pinball manufacturer Steve Kordek. Drop targets were targets that would “drop” after being hit with the ball and would reward the player with points for hitting the target (Bellis, 2019). Like flippers, drop targets are seen on almost every pinball machine made after their invention. Hitting drop targets using flippers are the most practiced shots in pinball; the development of this skill is paramount for competitive pinball players. Drop targets bolstered the rise of skilled pinball players as “insiders.”

On top of the addition of new features, changes in the existing features as well as changes in the presentation and rules of the pinball games also accomplished the goal of changing pinball’s perception towards a game of skill. This began as early as the 1950s when pinball machines began to use separate lights on the back glass to show scores rather than displaying scores directly on the playfield. (Bellis, 2019). The change emphasized the importance of focusing to keep the game alive rather than obsessing over the score during the game. This is important because it shows an example of how a design change, seemingly unrelated to the function of the game, was able to change the culture of how pinball games were to be played. This brilliant design choice highlights that the expertise of manufacturers and their status as “insiders” was a main reason pinball shifted away from its gambling roots.

Additional examples of the feature changes that emphasized skill include the 1954 addition of two player modes (Ruben, 2017) and the 1964 addition of the “add-a-ball” feature

(Black, 2012). The changing of the rules and structure of pinball machines with the addition of the two-player mode is important because it emphasized player skill through competitiveness. As for the “add-a-ball” feature, it was like the free play feature, but instead of rewarding a free game, a player won another ball by achieving a certain score. The manufacturers believed it was harder for a player to improve his or her score with an extra ball than it was to do the same with a free game (Black, 2012). The name choice of “add-a-ball” clarified that the added ball was to be played and could not be cashed out like the free replays on earlier gambling machines. The thoughtful decision of granting players an extra ball, rather than a free replay both made pinball more challenging and moved away from a feature (the free replay) that was infamous in its implementations in gambling machines.

Despite advances in pinball towards a game of skill, some manufacturers continued to design pinball machines as gambling devices. These few outliers were used as justifications for pinball bans across the country including the ban in New York City. In 1946, a slot-machine manufacturer created a “one-ball” pinball machine (rather than the traditional five balls) as a disguised slot machine with models that automatically ejected nickels after achieving a certain score. (Anonymous, 1950). Coming from the prior background of slot machines, this manufacturer used his role as an “insider” in the slot machine industry to try to enter the pinball market. These machines were short lived as they were quickly recognized by law enforcement officials as disguised slot machines and were banned shortly after their introduction (Anonymous, 1950).

Certain outliers point out that the shift in pinball towards a game of skill was not completely universal. One example of a gambling implementation of pinball following the beginning of the major shift towards a game of skill with the 1947 invention of flippers was the

1951 introduction of “bingo” machines. “Bingo” machines consisted of a playfield with 20-25 scoring holes that corresponded with a number on the six default bingo cards (which could be increased by the player inserting more coins) on the back glass and did not use flippers. A prize could be cashed out by winning a “BINGO” (Black, 2012). This is an important example because “bingo” manufacturers deliberately chose to not implement flippers, reverting to designing pinball as a game of chance. Manufacturers used their expertise to make a profit with the “bingo” machines by moving back towards a pinball machine that emphasized gambling. These machines also justified pinball bans.

Despite the few outliers of some gambling pinball machines still being produced after 1947, skill-based features were developed overwhelmingly more than luck-based games. These skill-based features were instrumental in shifting the game towards a game of skill. That aside, a potential counterargument is that the primary motivation for adding features rewarding player skill was not necessarily to remove the gambling stigma but to enhance the commercial viability of pinball machines. By introducing elements that required skill and strategy, game developers could increase player engagement and longevity of play, leading to higher profits. While it is true that increasing player engagement led to higher profits, the timing of when skill-based features were introduced aligns with significant legal battles and societal perceptions regarding pinball as a gambling device (Klein, 2016). This suggests that commercial viability may have been a secondary concern to addressing the negative image associated with pinball.

The Banning of Pinball in New York City

While pinball certainly experienced a shift towards a game of skill, a shift in the perception of the game did not occur in the eyes of many government and law officials, who I

will argue were the “outsiders” in this case study. Consequently, despite the proliferation of skill-based features in later years, numerous pinball bans initiated due to the presence of illegal gambling machines in the early era remained in place. The most notable example of this is the 1942 ban of pinball in New York City enacted by Mayor LaGuardia. Regardless of advances of pinball machines to prioritize skill over chance, the ban remained in place until 1976.

Certain political factors led to the 1942 ban by Mayor LaGuardia in New York City. One important example was the reputation and seizure of slot machines, which preceded the emergence of pinball machines. In 1934, New York City Mayor Fiorello LaGuardia seized around 2,000 slot machines, believing that these machines preyed on financial struggles following the Great Depression. (Ruben, 2017). This gave all coin operated gambling and amusement devices, including pinball, a bad reputation in LaGuardia’s eyes and paved the way for future legislation against pinball.

Another factor that established grounds for the ban of pinball was in 1935 when Jacob Mirowsky faced allegations of operating an illegal gambling establishment in New York City. To defend himself, Mirowsky presented three skilled bagatelle players (bagatelle was a game similar to pinball but without electronics) in court, aiming to demonstrate the game's reliance on skill. However, their inability to outscore a detective, who matched their high scores, led to the legal classification of the game as one of chance. LaGuardia saw the court’s ruling as “highly gratifying” and New York City and Brooklyn began refusing to issue and revoking licenses for amusement centers (Ruben, 2017). This case along with LaGuardia and New York City officials’ growing control over the regulation of pinball gave LaGuardia the authority to eventually enforce his ban of pinball. Furthermore, the negative publicity surrounding slot machines as well

as Mirowsky's case contributed to a broader societal perception of pinball as a game of chance rather than skill, further bolstering support for pinball bans.

A final nail in the coffin for pinball was the Salvage for Victory campaign, a 1942 World War II recycling effort. This campaign made pinball machines seen as a waste of materials and unpatriotic (Ruben, 2017). LaGuardia saw it as “infinitely preferable that the metal in these evil contraptions be manufactured into arms and bullets which can be used to destroy our foreign enemies” (Klein, 2016). This rhetoric not only highlighted LaGuardia’s personal disdain for pinball, but it also tapped into patriotic sentiments during the wartime. This further vilified pinball as an unnecessary pastime and strengthened public support for its prohibition which started shortly after the campaign in 1942.

As pointed out in the previous section, the few instances of gambling-oriented pinball machines that emerged after pinball bans started provided rationale for the continuation of the bans. This, coupled with pinball's tainted reputation stemming from its initial association with gambling further reinforced the ban. However, the ban also persisted due to government and city officials' failure to recognize pinball's evolution towards a skill-based game, starting with the introduction of flippers in 1947. Government and city officials played the role of “outsiders” during this time because they had a lack of expertise regarding the state of pinball, yet they were the ones responsible for enforcing the ban. This sparked a rise of skilled pinball players as “insiders” who emerged during pinball’s transition towards a game of skill and sought to put an end to the ban of pinball.

The emergence of skilled pinball players throughout the decades where skill-based features were introduced directly resulted in the lifting of pinball’s ban. These skilled players

were instrumental in the lifting of pinball bans across the country. In 1974, The California Supreme Court ruled that pinball was more a game of skill than chance and overturned a ban in Los Angeles (Klein, 2016). It is likely that the court's perception of pinball manufacturers and skilled pinball players as "insiders" and of city officials as "outsiders" was key in establishing this precedent. In New York City, one professional pinball player, Roger Sharpe, got most of the credit for causing the ban of pinball to be lifted. In 1976, Roger Sharpe famously called and made difficult pinball shots in a city hearing, resulting in the immediate lifting of the ban (Klein, 2016). In this hearing, Roger Sharpe was arguably the most important expert and "insider" of the entire history of pinball, because he was responsible for giving direct proof that pinball had changed from a game of complete luck to a game of mostly skill.

One potential counterargument for my assertion is that the economic repercussions of pinball bans, resulting in lost revenue for operators, manufacturers, and related businesses, were instrumental in motivating efforts to overturn them. While skilled players showcased the game's popularity and cultural significance, it was likely that the impact of skilled players was overshadowed by economic factors. My rebuttal to this counterargument is that skilled players like Roger Sharpe attracted attention to pinball as a form of entertainment that drew crowds and generated revenue (Ruben, 2017), making it harder for authorities to justify bans solely on moral or economic grounds. These individuals also proved that there was a market for pinball, bringing light to the economic repercussions of pinball bans.

Conclusion

Despite taking several decades, the progressive evolution of pinball through the gradual introduction of new features that rewarded player skill directly contributed to the transformation

of its negative reputation, stemming from its gambling origins, into one characterized by its competitive nature as a skill-based game. Pinball manufacturers played the role of “insiders,” and their expertise was instrumental in changing the perception of pinball. Once the game of pinball started experiencing a shift towards an emphasis of skill, talented pinball players emerged as “insiders.” These players leveraged their expertise to advocate for the removal of pinball bans throughout the US, such as Roger Sharpe did in New York City. Through this action, pinball experts persuaded the government and city officials (the “outsiders”) with limited understanding of pinball's complexities that the game relied more on skill than luck.

This research matters because it considers an instance where engineering design choices directly influenced policy. In the grand scheme, the impacts of pinball design on legislation were not as consequential as the impacts of the designs as other technologies. However, it provides an instance of an interesting case study that is largely unknown. Because of this, my hope is that my analysis will inspire other aspiring engineers to consider the history of technologies more deeply when developing them and to more deeply investigate why certain design choices were made and how design choices can impact how people morally (or even legally) access a technology. Future work could apply the conceptual framework in a similar way to examine and analyze other cases of technologies where insider views were different than those of outsiders which created conflict. On that note, another aim of my research is to encourage engineers to take into account the perspectives of outsiders when developing new technologies, in the hopes of narrowing the gap in viewpoints between insiders and outsiders.

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