Understanding gambling and gaming skill and its implications for the convergence of gaming with electronic gaming machines

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Abstract

Skill-based elements are increasing being introduced to electronic gaming machines to appeal to a broad consumer cohort by offering different play experiences. In this paper, we examine what is meant by skill in gambling and to what extent electronic skilled-gambling games differ from existing forms of gambling. Using examples drawn from recent market releases, we examine the ways in which skill-elements are being incorporated into gaming machines. As we will highlight, the industry could look to profit from skilful games in different ways: one model might allow skilful play, but in a context where the long-term RTP always remains negative. Another model might allow individual players to obtain greater returns through competition against other players or genuine opportunities to obtain a positive RTP, but where this will only be achievable for a minority of players. We discuss the potential implications of these differences for player experiences as well as game profitability. We argue that a deeper understanding of how similar structural differences operate in video-gaming might provide useful insights into how popular and successful (from an industry perceptive) these games are likely to be as well as the potential implications for policies, problem gambling and treatment.
Introduction

The modern gambling industry is currently undergoing a period of significant change. In many jurisdictions, participation rates for many land-based activities have fallen and there has been a significant increase in online gambling activity, particularly in online sports wagering (Gainsbury, Wood, Russell, Hing, & Blaszczynski, 2012; Russell, Hing, Browne, & Vitartas, 2018). Most concerning for the industry has been the declining popularity of some of the most lucrative activities including electronic gaming machines. In Australia, for example, participation rates for gaming machines have fallen from figures as high as 40% in the 1990s to only around 20% in recent prevalence surveys (Gainsbury, Russell, Hing, Wood, Lubman, & Blaszczynski, 2015). Regular or weekly participation rates are now as low as 3% and expenditure, in real terms, has declined over the last 15 years (Queensland Treasury, 2018). These changes have led the industry to reconsider the nature of its operations and, in particular, the best strategies to capture new gambling markets which are increasingly populated by: (a) ‘Millenials’ or people who have grown up in the Internet generation characterised by access to smartphones, tablets, advanced gaming consoles and social media, and (b) People whose principal interaction with technology-based entertainment has involved early, often coin-based, arcade-based video- games.

One strategy used by allied industries (e.g., social media game industry) to capture younger demographic groups (i.e., those aged 18 to 50 years) has been to develop hybrid or simulated gambling activities that enable people to have gambling-like experiences on portable devices. Examples include: social casino games (e.g., Slotomania, Zynga Poker), dedicated gambling modules on video-consoles, or embedded gambling-like activities in larger video-games (Gainsbury, Hing, Delfabbro, & Hing, 2014; King, Gainsbury, Delfabbro, Hing, & Abarbanel, 2015; Teichert, Gainsbury, & Mühlbach, 2017). A related strategy has been the introduction of ‘loot boxes’ (a gambling-like activity) in video-games that allow players to pay for opportunities to obtain game items based on chance-based algorithms (Gainsbury, 2019; Mentzoni, 2018). More recently, an emerging trend has been for the reverse to occur; namely, for the gambling industry to incorporate skill-based or gaming-related features into traditional games of chance such as gaming machines to make them potentially more appealing to a wider range of players. Industry marketing now increasingly
refers to the need to develop greater excitement and diversity in its offerings through, ‘enhanced player value’ and ‘positive expected value opportunities’ (Reaser, 2018).

For governments, who have observed a gradual decline in tax revenue from gambling markets, this demand for change has been accommodated by changes to legislation that enables greater diversification in gambling activities. Such a change, for example, has occurred in the US State of Nevada (Senate Bill 9, or SB9 in 2016) through the legalisation of variable payback percentages for slot machines. In effect, this means that the industry can offer machines where the long-term return is not set to a specific value. Machines can instead offer a minimum return but increase the return to player (RTP) based on individual player behaviour. Within this legislative framework, it thus becomes possible for the industry to offer hybrid games of skill and chance in which players can choose to play gaming machines as they did before, but also play gambling games that contain skill elements. However, the way in which the industry is incorporating skill-elements appears to show some variation. Some of the current offerings principally evident in the US, for example from Next Gaming, involve opportunities for players to buy credit to play 80s-style arcade games such as Asteroids or Galaga games which allow players to alternate between skill-based and chance-based game-play (e.g., Scientific Games’ Space Invaders based on the early 1980s Atari game). Others involve opportunities to win more money by playing skilfully (e.g, Catapult King by Gamblit is similar to Angry Birds), whereas others involve playing pinball (Vegas 2047 Pinball by Nanotech) to lower the odds of winning in a bonus round. Some are competitive in that they offer opportunities to win prize-pools that are set between groups of players (e.g., Gamblit’s PacMan Battle Casino). In Canada, in the province of Ontario, slot-machines from the company Gotskill have recently been allowed outside casinos on the grounds that they contain a genuine skill element (Tadman, 2019). In these games, which ostensibly resemble regular moving reel slot-machines, game play is set up in two stages. People spin reels for chance-determined prizes (which may be zero or some positive number) and then they are asked to play a skill-based reaction-time task that sets the multiplier or return rate (e.g., 50% or up to 110%). Similar to ‘tracer light games’ or block stacker games observed in children’s amusement arcades, players must follow the movement of a fast moving marker across a ruler of percentages. If they can make it stop at 110% then they can increase their winnings. If a skilful player can do this continuously, then
it is theoretically possible for a player to obtain a RTP higher than 100%. As a result of some players being able to over-ride the element of chance using skill, the game has been considered a game of skill and can be made legally available outside casinos. At the time of writing this paper, this legal decision is being challenged.

For the most part, most of these new skilled-based video games appear to be designed to provide additional entertainment value. Although skilled elements are included, the games are nonetheless forms of gambling which are based on algorithms which ensure that the industry will return a profit. As we will argue, there appears to be two principal types of activity which appear to be emerging as the industry’s way to attract the video game market and to achieve these objectives. One type of game appears to be largely focused on nostalgia and familiarity to allow players additional entertainment value, but where the RTP will always be negative to guarantee a profit for the industry. The other model is to offer games with a potential positive return for highly skilful players, but where this is difficult to achieve, so that most profits will continue to be made from less skilful players.

In this paper, drawing upon what is known about the psychology and design of video-games, we develop some hypotheses relating to the potential strengths and limitations of these two designs and how they might affect player gambling experiences and how successful or profitable these games will be for the industry. The paper places these recent developments into context by providing a conceptual overview of what is meant by skill in gambling contexts and the differences between gambling and video-gaming. It then proceeds to discuss way in which skill is conceptualised in video-gaming and how this has implications for the design of skill-based gaming activities.

**Gambling vs Skill-based Gaming**

Gambling is generally classified into two broad classes of activity: wagering and gaming. Wagering involves placing bets on outcomes or events where the rate of return is determined by specified odds and/or the size of the funding pool. It includes activities such as sports betting, race betting, or wagers involving high-profile events (e.g., who will win an election). Gaming (in the gambling context), on the other hand, refers to activities where
outcomes are mathematically proscribed based on the laws of probability. Examples include gaming machines, lotteries, keno, and most types of casino table game, including baccarat and roulette. Each outcome that occurs has an assigned probability and payout such that it is possible to calculate an exact house edge or profit margin (e.g., 2%) or return to player (e.g., 87%). Both classes of activity are considered gambling because each involves the staking of something of value (money, time or property) on uncertain outcomes that are determined by an inevitable element of chance. In effect, activities are generally designed to yield a profit for the industry and provide limited opportunities for players to beat the odds. For example, in fair games, no player can expect to exceed the long-term return to player (RTP) except by cheating or strategies such as ‘card counting’ in blackjack. Similarly, while it is possible for some people to pick winning outcomes in wagering activities, the industry can set odds in a way to make profits margins very small. Generally, only a very small percentage of people will be able to claim to be successful ‘professional’ gamblers. Some of these involve syndicate operations that use algorithms and arbitrage: placing large bet amounts on many outcomes with small margins. Another way has been from playing ‘professional poker’ where the outcomes are strongly influenced by the ability to interpret social cues, hold one’s nerve, rather than just strategies based on the nature of the game play itself. Thus, while most people who play poker experience it as a gambling game where success is largely dictated by chance-determined outcomes, professional players succeed through their ability to perceive multiple sources of information to guide their decision-making and enact optimal strategy. Nonetheless, as the cards drawn are always random, even highly-skilled players do not always succeed.

Although there are legitimate arguments about whether professional poker is a form of gambling (Meyer, von Meduna, Brosowski, & Heyer, 2013; Potter can Loon, von den Assem, & van Dolder, 2015, von Dolder, 2018), most researchers and legislators argue that gambling can generally be distinguished from other activities based on the extent to which outcomes are determined by skill and chance. In some countries (e.g., the United States), this is based on what is called the ‘dominance test’ (Mindell, 2018). Any activity where outcomes are largely determined by chance will be considered gambling. Alternatively, the courts may look for activities that contain a ‘material’ element of chance or any element of chance that cannot be reduced by any action of the gambler. This latter test, for example, is
usually used in Australia and can include activities which have outcomes which are purely chance-determined (e.g., lotteries) or activities which contain a mixture of skill and chance (e.g., sports wagering). Conversely, some countries such as the United Kingdom tend to favour the view that it is the presence of skill, rather than the presence of chance, that enables an activity to be classified as something other than gambling or sound like gambling to an observer.

Generally, it appears easier to find agreement concerning the features of skill-based activities (Mindell, 2018; Walker, 1992). Such skill can be displayed in several ways. For example, one might observe improvements due to practice; strategies or tactics; the ability to make the optimal decisions; physical co-ordination or dexterity; or specialist knowledge. Skill can be physical, mental or social. Typical questions asked in ‘dominance of skill’ tests include whether: it is possible to win without using skill; if players require skills to participate in the game; if skill influences the outcome of the game; and if players are aware of the skills and criteria that can be consistently applied to determine the winner (Thompson-Coburn, 2018; van Dolder, 2018). Irrespective of which of these elements is present, the combined effect should be to yield meaningful influences upon behaviour and outcomes. Players should typically get better with practice and be able to learn from experience; it should be possible to differentiate players or play quality based on differences in skill; and players who have the greatest skill should typically have more frequent positive outcomes than other players. This latter test, for example, is emphasised by Kahneman (2013) in his popular book Thinking Fast and Slow, in which he questions the true level of skill in fund managers based on the observation that the top 10 performers are often not the same from one year to the next. There are activities such as stock-market trading which may be difficult to classify and which are subject to ongoing contention (Arthur, Williams, & Delfabbro, 2016). However, there are a range of activities where skill is the dominant factor and where the term ‘skilled activity’ would appear to be a correct description; for example, video-games (e.g., Pacman, Space Invaders, Galaxians), table tennis, chess, bridge and playing darts. Regardless of technical and regulatory classifications, consumers appear to use their own judgment and classify certain gambling activities as being more aligned with skill than others and conversely some gaming activities more similar to a chance-based gamble (Teichert, Gainsbury, & Mühlbach, 2017).
Skill in Gambling: Winning or Loss Minimisation?

Gambling skill can be displayed in numerous ways, but it is important to differentiate between skill as a method for winning as opposed to optimisation or ‘sensible play’. Optimisation or ‘sensible play’ could apply to many forms of gambling including those where outcomes are entirely determined by chance. Although players cannot improve upon the house edge and will inevitably lose if they play repeatedly, they can minimise losses. Thus, there can be some knowledge or skill involved in picking the machines which have the best returns; choosing the right hands that optimise performance in blackjack (e.g., play Basic strategy) or try to choose teams or horses with a reasonable chance of winning based on their form when placing wagers. Other strategies might relate to ‘sensible’ budget management that enables people to gamble and obtain the experiences they want (e.g., a certain amount of game play). For example, if one chooses to play a more volatile playing style in roulette (e.g., single numbers vs. reds/ blacks or odds/ evens), it will be important to have larger budget or ‘float’ for the session of gambling. In lotteries, although each pattern of numbers is equally probable, there are some which are less commonly chosen by other players (e.g., 13s, numbers around the edges or those in a row, above 31) enabling consumers to select number outcomes which are less likely to be shared in the event of a successful combination.

However, in most discussion of true skill, one is referring to situations where players might be able to: (a) increase the objective probability of winning or (b) even make a profit from gambling. Although (b) would usually imply (a), the reverse may not always be true such as when players can use skill to increase the RTP but cannot elevate it beyond 100%. For example, using Basic Strategy in blackjack or studying form guides in race betting are both strategies which might allow more experienced players to perform consistently better than novices, but neither would necessarily be considered skilful if one defined skill in terms of a genuine ability to beat the odds. This distinction is important because it does not necessarily follow that new skill gaming features will enable individual players to profit from their skill. Instead, rather like choosing machines with better returns, some features may only enable players to slow down the rate at which they lose money.
Probabilistic Definitions of Skill and the Skill-Chance Trade-off

Another important consideration is the relationship between skill and chance (or non-skill-related outcomes). In experimental psychology, the term skill is a term commonly equated with the concept of contingency in operant conditioning (Alloy & Abramson, 1979; Langer, 1975; Matute, 1995). Contingency is said to occur when the probability of outcomes given a response or $P(O/R)$ is greater than the probability if no action where taken, or $P(O/No R)$, such as might apply if one allowed chance or ‘luck’ to determine the outcome. Contingency increases when the difference between these two probabilities is greater. Thus, one would usually argue that contingency is 100% in a situation where a person must press a button to make an elevator arrive (it would not come without a press), but lower in a situation where one rang a bell to summon a pet to dinner (the cat might come anyway!). By contrast, EGMs and lotteries are examples of activities where the long-term probability of outcomes (winning) will be the same irrespective of how one gambles, $P(O/Strategy) = P(O/No strategy used)$.

As Mindell (2018) points out, logic of this nature is sometimes applied when appraising activities in relation to the dominance test. The qualities of skill and chance are seen to exist in a form of trade-off, such that an increase in one lead to a reduction in the other. The more skilful a game, the less chance plays a role. In statistical terms, this effectively means that outcomes become more predictable or that the variance of outcomes for a given player should become smaller, ceteris paribus. Variations in outcomes should, therefore, become increasingly associated with variations in skill both between players as well as across time for single players such that an expert player should expect to win more often than a novice player. In this sense, skill serves to reduce uncertainty such that the player will only have to play well in order to obtain the desired outcomes.

Such logic is easy to apply to games like darts, chess, most skill-based sporting activities and video-games. However, as pointed out by Mindell (2018) and Maudoussin (2012), a problem with this argument is that the extent to which skill will yield a material advantage is likely to be highly context bound. In skilled activities which involve competition, it will certainly be true that more skilful players should consistently expect to defeat less skilful ones. This is self-evident in international rankings for games such as chess.
and sports such as tennis and golf that will show that higher-ranked players are usually more likely to win major tournaments than the lower-ranked players (when rank is used predictively). Where this argument runs into difficulties is in relation to variations within skill levels. If players are largely matched in skill, then skill no longer will have such a strong influence on outcomes. Maudoussin refers to this as the “skill paradox”. At very high levels of performance, players make fewer mistakes and outcomes are much more likely to be determined ‘on the margin’. For example, as Mindell points out, one might only need to obtain a few more points in tennis to win many more games and sets. In the same way, slightly better performance on the putting greens could yield a win in a major golfing tournament. As a result, random or chance factors may once again come to play a major role in which player of similar ability wins the contest. Any player who is slightly ill, slightly injured or who gets distracted at a key juncture of the tournament may be disadvantaged enough to lose against other similar ability players. Much the same situation is likely to apply in highly skilled video-games which involve intense competition and highly frenetic play.

What the “skill paradox” argument shows are that skill and the predictability of outcomes are not necessarily the same. Although playing a skill-based game and being skilful means that outcomes are contingent or influenced by one’s actions, the predictability of outcomes or the level of uncertainty associated with outcomes is not stable (see also Lorains, Dowling, Enticott, Bradshaw, Trueblood, & Stout, 2014). Such an issue is probably already likely to be evident in activities such as poker (offline or online) where, even experienced players, might struggle to return a profit if they are faced with other similarly skilled people (or ‘bots’ as is often the case in online poker). This issue was identified, for example, by Turner and Fritz (2001) in a simulation of poker and roulette. When poker players were of similar ability, outcomes were random, but the outcomes for less skilful players were less favourable when skilful players were also present. For roulette (a chance-determined) game, this never occurred. We argue that similar issues may arise for any new skill-influenced gaming games that allow for players to compete against one another. In video-game contexts, it is well-known that skilful players can dispatch novice opponents very quickly in competitive sports or combat games and therefore skilful players can be confident of a win each time. However, as the pool of skilful players gets larger, success
becomes increasingly less certain and so the level of certainty in outcomes decreases. In other words, in a situation where most players are skilful (and so the overall level of skill in the game play is higher), the influence of individual skill could paradoxically diminish in importance. Thus, from a technical perspective, outcomes from the activity can become highly unpredictable from the standpoint of individual players. As a result, the playing experience may not be very much better than if the game had been pure chance (e.g., in terms of outcome or play duration).

Such gaming situations are also likely to be less desirable for novice players. If many very skilled players are already in the game, then entering a game could be something akin to entering a shark-tank. As novice players in some multi-player combat, racing or first-person shooter games will attest, players may be quickly defeated within a few seconds and therefore obtain very little return on their time, money or effort. In support of this view, Mindell (2018) observes that new hybrid activities such as Daily Fantasy Sports where people earn points or place wagers on the performance of teams of sports-people, appear to have some of these characteristics. As with some forms of gambling (e.g., tournament poker), the business model is based on only a very small percentage of players doing well. Most other players would be expected to do poorly. A similar business model or logic would appear to underlie the introduction of skill-based gambling machines. For example, as one of the leading manufacturers, Nanotech, indicates in its website documentation: the system “allows a very small number of highly skilled players to enjoy a consistent advantage and thus overall lifetime winnings because of the majority of money bet on below average skill and scores”. A similar argument might also apply to Canadian Gotskill games which involve opportunities to use reaction time to stop the ‘percentage return’ marker at a higher percentage. If the typical player cannot do this very well, then the skill element of the game may not come into play very often. In effect, it will little advantage for the typically player and therefore the game will still be largely a game of chance. Such a point was raised in the legal decision-making associated with the legalisation of Gotskill outside casinos (Tadman, 2019) which suggested that the game was a mixture of skill and chance and therefore probably a gambling activity, but the judge’s final decision was made in reference to the hypothetical skilful player who might be able to obtain a profit. Thus, while all players can
enjoy the experience of skilful play, only a few players will ever achieve an “expected value” advantage that is likely to yield a long-term profit.

Activity types and outcome variability

Many of the concerns raised by Mindell (2018) are predicated on Mauboussin’s (2012) discussion of situations where players are faced with a particular type of gambling situation; namely, one in which there are multiple players (as might be true in many competitive sports). However, it is important to recognise that most video-game tasks (which are intended for combination with gaming machines in the near the future) are single player games. This is evident in current offerings by leading companies such as Gamblit and Nanotech and others who are displaying their products at gambling expos around the world. Accordingly, from a conceptual perspective, it is important to understand the conceptual distinction between the different potential design of activities in terms of the interplay between chance and skill. In games of pure chance, there is no way to reduce outcome variability or skill and so all the variance is explained by chance. Conversely, a person who is playing a single player video-game which has pre-programmed outcomes (e.g., classic games such as Pacman or Donkey Kong) might be expected to obtain a better performance over time, as the player skill level increases. Thus, the outcome variance due to chance will decrease as an increasing amount is accounted for by skilful play. With games that have repeated outcome sequences (e.g., the barrels in Donkey Kong move the same way in each game), it is possible that the person might be able to succeed nearly every time (however this is defined). On the new skill-influenced gaming machines, the law will generally require that some element of the game is pure chance so as to ensure that it still meets the definition of ‘gambling’. As a result, no amount of skill or practice may lead to mastery of the game. Players will get better with practice, but the game will be relatively harder to predict and control as an equivalent video-game. Depending on the game programming, players may improve with practice, but the game could include sufficiently difficult randomly determined events so that in the long run, players are unable to perform at a level that would afford them any sort of advantage. For example, if games were designed to take advantage of legislation that allowed variable returns and offered a RTP of
80% to 120% (20% long-term loss vs. 20% profit) where the RTP increased as a result of skilled play, it could be that the task load required to obtain over 100% could be set at extremely high levels to make it nearly impossible for a regular player to obtain a profit.

Conversely, if the game is of the type envisioned by Mauboussin (2012) and has a multi-player format then, as described above, the logic above will no longer hold and the situation facing players would be additionally complex. The predictability of outcomes will no longer be a function of the skill of the individual player, but also of the composition of the population of the players. It would generally be true that players of higher ability would expect to be successful (or have an advantage) over players who fall into lower ability groups in the short term. However, as the skill level increases, players are likely to make fewer and fewer mistakes and so skill differences or variance (a) will become increasingly less important, whereas chance factors (b) will become important. The significance of these sources of variance is that a skilful player’s expectations or sense of certainty is likely to vary depending on the nature of the competition. As more and more players reach the higher levels, then one’s chances of winning decrease. Between group differences will still exist, but the relative influence of less skilful players will be reduced if one encounters few of them.

The implication of this is that skilful games may increasingly not yield much of an advantage for players once there are many other skilful players. In competitive games, there may only need to be one or two highly skilful players present at any one time to prevent anyone else obtaining a good win. At the present time, only a relatively small number of skill-influenced gaming machines on the market allow for competition between players. An example of such a competitive style gambling video-game is *Gamblit’s Pacman Battleground Casino* where players place stakes at the start (e.g., $10-20 each) and then play Pacman to win a randomly determined prize pool by being the last player still active in the game (i.e., not eaten by the ghosts or other players). One’s chance of winning will be highest when new to the game, skilful and there are few other players. For many players, particularly those who come in as a group to play, this may not be problematic if their principal motivation is to ‘have fun’ and enjoy the competition. However, if games of this nature become more common and with higher payouts, there is the potential for more skilful players (like ‘pool sharks’) to dominate the games. As in pool, there may be skilful
players who try to ‘hustle’ other players by pretending that they are not very skilful so as to encourage others into the game, but then play skilfully when the stakes are higher. Although such competition between players may already be observed in venues where they are ‘competitive jackpots’ involving players on multiple machines trying to win a common prize, the situation here is slightly different. In competitive jackpots, there is no skill involved, so that each player could potentially win. However, if the prize is determined by differences in skill, a novice player may have little incentive to compete for the prize and therefore stay away.

Psychological impacts and implications for gambling behaviour

Although the inclusion of skill features in games has the potential to make games more entertaining and, in some cases, provide opportunities for players to obtain a better return, these developments raise some concerns. It is well documented that many gamblers and, problem gamblers in particular, have erroneous views about the nature of gambling outcomes. The amount of control or skill available in a game can be over-estimated or skill can be inferred when outcomes are largely chance-determined or non-contingent (e.g., Joukhador, Blaszczynski, & Maccallum, 2004; Ladouceur, Sylvain, Letarte, Giroux, & Jacques, 1998; Lambos & Delfabbro, 2007; Raylu & Oei, 2004; Thompson, Armstrong, & Thomas, 1998). Such beliefs tend to be stronger in problem gamblers and are commonly identified and addressed in cognitive therapy. Such perceptions are often referred to as the ‘illusion of control’ and this refers to a subjective estimate of skill that is greater than the objective probability. Such beliefs can be problematic in that they may lead people to be overly optimistic about their chances of winning or lead to false attributions about the causes of successful outcomes.

A danger of many of these skill features is that some skill features do not provide opportunities for any genuine improvement in the RTP. Instead, they are largely included to create greater ‘entertainment value’ or player interest, rather like some of the ‘skill features’ and ‘hold buttons’ that have been previously discussed in relation to earlier slot-machines, particularly in the UK (Griffiths, 1995). Other features, as we have argued, might
be so difficult to use or not yield positive outcomes when there is skilled competition from
other players and so this may also negate any genuine advantage to players. In our view,
such features may create problems in several areas. First, there may be some players who
are not able to differentiate between genuine skill and pseudo-skill features in these new
games and who may decide to gamble longer or more intensely because they might believe
that there is some opportunity to achieve a positive return through persistent play. Second,
the existence of these features may create confusion in messaging or treatment strategies
that involve education about the chance-determined nature of gaming machine outcomes.
If some machines have skill, others do not, and some are a mixture of chance and skill, then
it may be harder to educate players about the nature of gaming machines. A third concern is
that people may over-generalise their experiences from genuine skill-based games (if these
exist) to other similar activities. King, Delfabbro and Ejova (2012), for example, conducted a
study that compared the level of illusory control displayed by video gamers and people who
gambled. The results showed that those people who gambled and played video games (i.e.,
who were accustomed to skill-based or contingent outcomes) displayed a stronger illusion
of control in an experimental task than pure video gamers or those who only gambled. It is
not difficult to see some of these hybrid games as targeting a market which is likely to
include people with both video game and gambling experiences.

Finally, as pointed out by an anonymous reviewer of this paper, it is important to
acknowledge that debates concerning the influence of the presence of absence of skill
features are predicated on the assumption that winning money and cognitive factors are a
fundamental factor in problem gambling. Although many psychologists support this view
many problem gamblers gamble for a variety of reasons, including to escape problems, so
that adding these new features might serve to create a greater sense of immersion rather
than a new challenge or test of mettle (e.g., as might be reflected in the use of nostalgia,
fantasy themes and music).

Summary and Conclusions

The principal motivation for the introduction of new skill-influenced gaming
machines is to enhance profitability by attracting new types of players who might not
previously had an interest in conventional chance-based gaming machines. It would appear that most emerging products are largely focused on attracting players based on the perceived entertainment value of machines (e.g., the nostalgia of playing older video-games while gambling as well as a more diversified style of gambling). This business model would appear to be based on algorithms and designs which allow skilful behaviour to be displayed, but which do not generally allow high levels of skill to be rewarded with long-term positive outcomes. In our view, a potential challenge with these games is that they may not (a) necessarily maintain longer-term player interest once the feeling of nostalgia has passed, and (b) may not be attractive to experienced video-game players who, based on their experience of video-games, have a long-term expectancy of winning using skilful play. Thus, these games may not, in the end, provide a sustained elevation in the 'player experience' if players realise that they are 'rigged' to yield a negative return just like regular gaming machines. As a result, the second business model, based on the introduction games with a potential positive return or which offer competitive play based on skill may be more attractive to genuine video-game players. Such models operate on the assumption that very skilful players will be rare and that most players will lose money, rather like what happens in competitive poker. However, as we show in this paper, offering genuinely skilful games has its own challenges as well, if it becomes difficult for newcomers to win due to the presence of existing skilful players.

The implications of this conceptual paper are that if the industry is motivated to attract the video-gaming population it is probably best served by developing a product mix that meets the needs of different types of player. There will be those who will be motivated largely by the novelty and entertainment and may be less interested in winning money over a longer period. Others, conversely, may expect to be rewarded for high levels of skilful play. These observations lead us to the expectation that the success of these recent industry developments may be influenced by how well the industry understands the different types of people who are likely to be attracted to these new activities. It may be, for example, that older gamblers (e.g., who were teenagers in the 1980s) will be more attracted to games that provide nostalgia, but that millennial video-game players are more likely to be attracted to activities that provide a genuine opportunity to leverage the skills which they have developed playing sophisticated modern video-games.


