2007 01T 1711 CP

IN THE SUPREME COURT OF NEWFOUNDLAND & LABRADOR
TRIAL DIVISION

BETWEEN:

THE ESTATE OF SUSAN PIERCEY, as represented by KEITH PIERCEY, and KEITH PIERCEY AND CATHERINE PIERCEY in their own right — **PLAINTIFFS**

AND:

ATLANTIC LOTTERY CORPORATION INC. –SOCIÉTÉ DES LOTERIES DE L'ATLANTIQUE — **DEFENDANT**

BROUGHT UNDER THE *CLASS ACTIONS ACT*
BEFORE THE HONOURABLE MR. JUSTICE DYMOND,
CASE MANAGEMENT JUDGE

AFFIDAVIT OF KEVIN HARRIGAN, PhD

SUMMARY OF CURRENT DOCUMENT	
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Date of Filing of Document:	December 18, 2007
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Application to which Document being filed relates:	Application of Plaintiffs for certification as a class action.
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Solicitors for the Plaintiffs
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St. John's, NL A1C 1B1
Attention: Chesley F. Crosbie, Q.C.

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AFFIDAVIT OF KEVIN HARRIGAN, PhD

I, Kevin Harrigan, PhD, of the Town of Fergus, in the Province of Ontario, MAKE OATH AND SAY:

1. I have personal knowledge of the facts stated herein except where stated to be on information and belief and I believe the facts and opinions stated herein to be true.

2. I am a Research Associate Professor at the University of Waterloo. My main area of research is the design and programming of games on Electronic Gaming Machines (EGMs) including slot machines and Video Lottery Terminals (VLTs). My Curriculum Vitae is included as Exhibit A.

3. I have recently published three academic papers related to the design of slot machine games and the potential implications for problem gambling. I am leading a new research team at the University of Waterloo that is focusing on the "structural characteristics" of EGM games that may have the effect of exacerbating problem gambling.

4. Probability Accounting Reports, commonly known as PAR Sheets, are technical design documents created by slot machine manufacturers and Video Lottery Terminal (VLT) manufacturers for each game. PAR Sheets provide information related to the underlying computer algorithms, math and statistics of how the games work. Since approximately 2001, I have studied approximately 100 PAR Sheets for traditional mechanical slot machine games. I acquired these PAR Sheets through various sources including obtaining fifteen PAR Sheets in the past six months for games currently in use in Ontario through requests under the Freedom of Information and Protection of Privacy Act (FIPPA). PAR Sheets have traditionally not been made available to the public and, to my knowledge, the Ontario PAR Sheets I obtained through FIPPA are the first PAR Sheets to have ever been made publicly available in Canada.

5. Traditional mechanical slot machines have physical reels that spin whereas the more modern "video slots" and "VLT line games" have a computer screen on which animated spinning reels are displayed. These more modern games tend to be more sophisticated and usually contain a bonus game feature. I have studied approximately 17 "video slot" and VLT line game PAR Sheets. Video slot games are similar, if not identical, to VLT line games. I have not yet had the opportunity to study PAR Sheets for VLT line games in use in Newfoundland and Labrador (NL) as they have not been publicly available. I understand from Mr. Crosbie that he has submitted a Freedom of Information request for PAR Sheets to the Atlantic Lottery Corporation.

6. As part of my research, over the past seven years I have played slot machines, video slots, and VLT line games hundreds of times. I visited St John's on November 30th and December 1st, 2007 and played line games on VLTs for approximately 10 hours.

7. I teach a course on designing computer games at the University of Waterloo. Over the past seven years I have read about the design of slot machine games in various places including gaming industry trade magazines, and I have talked to various

gaming industry employees at various places including trade shows. I am familiar with the design of computer games in general and specifically EGM games.

8. Testing labs test EGM games to ensure they meet jurisdictional regulations. In approximately 2001, I had many discussions regarding testing with the then head of Ontario's testing lab and I visited the lab twice to see and learn about the testing process. Two large independent testing labs are Gaming Labs International and TST Global. I have studied the websites of both of these testing labs which have detailed explanations of many aspects of the testing process. At the request of the Ontario Problem Gambling Research Centre, I recently gave advice on Ontario's testing lab standards which are called "Electronic Gaming Equipment Minimum Technical Standards – Draft" and are produced by the Alcohol and Gaming Commission of Ontario (AGCO) which regulates the Ontario Lottery and Gaming Corp. (OLG). I have studied in detail the gaming regulations of my home jurisdiction of Ontario, and those of Nevada, the "granddaddy" of gambling jurisdictions, and have read the regulations for approximately six other jurisdictions. Thus, I am familiar with gaming regulations and the process of testing EGM games to ensure they comply with the jurisdictional regulations.

9. Ontario has a player rewards program called Winner's Circle. Players register for Winner's Circle and are given a card which they insert into an EGM to earn reward points as they play. Accumulated points can then be redeemed for rewards such as complimentary meals. Several years ago, at the request of the RCMP, I analyzed the Player Rewards data reports for four players that had been supplied by the OLG with personal information removed. In reviewing these reports I saw that the OLC tracks each of the gambler's playing sessions, including what games were played, how long the player played, and how much the player won or lost. Based on viewing these reports and my general knowledge that jurisdictions keep detailed information on all plays on EGMs, it is my belief that NL would keep detailed tracking of all plays on VLTs and would have detailed records of all wins and losses broken down by the game types,

including line games, video poker, and video keno. Based on observing and speaking to hundreds EGM players, it is my belief that players would know which games types they normally play, including line games, video poker, and video keno.

Background and Terminology: Description of VLTs

10. Exhibit B shows promotional flyers for four VLT games that are approved for play in NL. Near the bottom of each flyer is an image of one or more VLTs. A VLT is approximately 2 meters high, 1 meter wide and 1 meter deep. It has a touch screen on which the game is displayed and from which the player can make various selections. There are also physical buttons below the screen which the player uses to play the game. The games are computer programs and are stored on computer chips located inside the VLT.

11. VLTs in NL have a bill acceptor which accepts cash from the player and the VLT displays the player's current balance. At the end of play, if the balance is not zero, the player presses "Cash-Out" and a ticket is printed by the VLT. This ticket can be redeemed for cash at the bar.

12. VLTs are multi-game machines as one VLT contains various games such as video poker, video keno, and line games. At the beginning of play, the player chooses what game to play and during play the player may switch between games.

Background and Terminology: Testing Labs

13. The games on VLTs are created and programmed by game designers and game programmers and others who are employed by the manufacturer of the VLTs. The manufacturer is responsible for ensuring that the testing lab is given the game and sufficient documentation so that the game can be tested to ensure it meets the requirements of the jurisdiction's gaming act, gaming regulations, and technical standards.

14. The jurisdictions whose regulations I have studied do not require testing against consumer protection standards such as fairness or dangerousness, and so the testing labs do not test against such standards. Rather, they test whether the bill acceptor works properly, whether the random number generator is acceptably random, and other matters which may be described as technical in nature.

15. Some larger jurisdictions such as Nevada and Ontario have their own testing labs. Many jurisdictions hire independent corporations to test their EGMs.

16. Some jurisdictions have an agreement whereby games that are approved elsewhere, such as in Nevada, may automatically be approved in their jurisdiction, subject to a small number of conditions such as meeting the minimum payback percentage for their jurisdiction. Ontario has such an agreement in the "Ontario Electronic Gaming Equipment Minimum Technical Standards – draft". The head of Ontario's testing lab told me that such agreements commonly exist across jurisdictions and thus it is my belief that the Atlantic Lottery Corporation (ALC) would also have such an agreement.

17. I have visited the Ontario testing lab on two occasions and read the detailed websites of two large independent testing labs, Gaming Labs International and TST Global, and it is my belief that after a game has been approved by the testing lab the game and associated documentation, including PAR Sheets, are then supplied by the manufacturer to the jurisdiction. My successful request for PAR Sheets in Ontario shows that Ontario does have the PAR Sheets for the games that are in use in Ontario.

18. Jurisdictions that are new to legalized gambling tend to use the testing standards from existing gaming jurisdictions as a base and may modify them to suit their particular needs. For example, NL has a $500 maximum limit for jackpot prizes. NL could accept the random number generator tests that are accepted in other jurisdictions but add a requirement that all approved games must have a maximum payout of $500.

19. Having read jurisdictional regulations and testing standards and testing lab documents, I have not seen any indication that testing labs test for any EGM structural characteristics that may promote or exacerbate problem gambling. For example, most jurisdictional regulations do not prohibit a high number of near misses, or failures that are close to wins, that have been intentionally designed into the games by the manufacturers and thus testing labs do not test for near misses. Even jurisdictions that do regulate near misses set arbitrary limits that are unrelated to the potential to exacerbate problem gambling. For example, Ontario allows the intentional programming of near misses to occur up to 12 times that by which they would occur by chance alone. Having studied regulations and PAR Sheets from other jurisdictions, I believe that VLT line games in NL contain one or more forms of the near miss.

20. I have read NL's *Lotteries Act* and NL's *Video Lottery Regulations* and neither contain the technical standards for testing VLTs. I do not know which testing lab tests the VLT games that are approved for play in NL.

Background and Terminology: Description of Line Games

21. VLT line games display animations of spinning reels similar to what players would see if they played a mechanical slot machine. On VLT line games in NL there are typically five animated spinning reels and the player can see three symbols on each reel. The promotional flyers in Exhibit B show images of the 3x5 matrix of symbols that the player can see when the reels are at rest.

22. When played, the touch screen displays animated spinning reels for approximately 5-6 seconds and then the animation stops. It is the stopping position that determines whether the spin is a win or a loss. Typically the leftmost reel stops first and then each reel stops in succession with the rightmost reel stopping last.

23. In NL, each VLT line game has a minimum base wager which is normally 5 cents. Players can normally wager from 1 to 5 times the base wager for wagers of 5, 10, 15, 20, or 25 cents.

24. For each spin, there are multiple lines on which the player can wager. For example, there are 9, 13, and 20 lines in the games in the flyers in Exhibit B. Exhibit C shows the layout of the lines that are commonly used in a nine line game. Each line is a separate game and thus only played lines are used to determine the win or loss on each spin.

25. On a 5 cent game a player may make a total wager of $2.25 by wagering 25 cents on each of 9 lines (9x0.25 equals 2.25) and thus that player is playing nine games in one "spin." Wagering the maximum amount on all lines, $2.25 in this case, is commonly referred to as "max bet." When playing 9 lines the player is playing nine games in six seconds.

26. The player can view the payouts by selecting 'Help' or 'Paytable' on the touch screen. The help screens show what combinations of symbols are wins and the amount that is won if the base amount were wagered. For example, in a Yard Sale'n game I played in NL the payout for the highest paying symbols on a 5 cent wager is: $5.00 for three occurrences of the highest paying symbol on any played line; $12.50 for four occurrences; and $100.00 for five occurrences. If the player wagers a multiple of the base wager then the payouts are multiplied by the multiple. For example, in the Yard Sale'n game if the player wagered 25 cents then the highest paying symbols would pay $25.00 for three, $62.50 for four, and $500.00 for five. The help screens do not show the probability of occurrence of each winning combination.

27. On many line games the order of the winning symbols is important. For example, in Yard Sale'n the symbols must be consecutive from left to right so a game outcome with the five symbols "TV, TV, TV, Mouse, TV" would count as three TV's, not four TV's, as there are only three TV's in a row starting from the left.

28. Each of the five video reels that is displayed and animated on a VLT is controlled by a table or array inside the computer. Exhibit D shows the table for a sample game with the five reels having 32, 40, 40, 40, and 38 symbols per reel. On each spin, the random number generator inside the VLT produces five random numbers. These random numbers determine the middle symbol that will be displayed on each reel. For each reel the adjacent symbols can be seen above and below the middle symbol. For example, if the random number for reel 1 is a 15, then after the 5-6 second animation the reels stop and the symbols in positions 14, 15, and 16 can be seen by the player.

29. The computer inside the VLT generates random numbers at the rate of tens of thousands per second at all times including when the game is not being played. The outcome of each spin on a VLT line game is an independent event. The game outcome is not influenced by past or future plays. The game outcome is determined by the random numbers that are generated at the millisecond the player presses "spin" and thus the player cannot somehow increase the odds of a winning outcome by timing the pressing of the "spin" button.

30. Payback percentage is the amount, on average, that the player "wins" on each spin. A Payback Percentage of 93%-95% means that on average for every $1.00 wagered the player will "win" $0.93-$0.95.

31. The Hold is the inverse of Payback Percentage. It is the percentage that the "casino" makes, on average, per spin. A game with a Payback Percentage of 93% has a Hold of 7%.

32. Hit Frequency is the percentage of game outcomes that are wins. It is calculated by dividing the number of winning combinations by the total number of possible outcomes. VLT line games typically have a Hit Frequency of approximately 10% on each line. A player playing only one line has a 10% chance of winning something on each spin. When playing a nine line game the player is playing nine separate games and thus has a Hit Frequency of 10% per line.

Background and Terminology: Description of Bonus Feature in Line Games

33. The four games in Exhibit B all have bonus features. Having studied video slot PAR Sheets, it is my belief that in VLT line games it would be common for approximately half of the winnings to be from the base game and half from bonuses. Bonuses are triggered by some random event such as in the Yard Sale'n game the bonus is triggered when two Yard Sale'n symbols appear on the same spin on the first and last reels. Players always win when the bonus feature is triggered.

34. In bonus mode, the player can typically win free spins and money such as in Yard Sale'n in which players entering bonus mode "are automatically awarded five free spins plus five times their current total bet." Some bonuses are only for played lines such as the Yard Sale'n Beaver Pot progressive which is only "awarded when a beaver symbol appears on all five reels on an active payline."

35. Some VLT line games in NL have a built-in progressive. A progressive is a 'pot' of money that accumulates. For example, the Yard Sale'n game that I played in NL has a progressive pot called the Beaver Pot. The Beaver Pot accumulates five cents for every $1.25 wagered and a background Beaver Pot accumulates 5 cents for every $5.00 wagered. When the primary pot is won the background pot replaces the primary pot. The maximum that can be in the Beaver Pot is $400.

VLT Line Games: Concealment and Misrepresentations of How the Games Work

36. The fundamental deceptions in VLT line games are at two levels and are summarized in this paragraph. My grounds for the statements made in this paragraph are explained in the remainder of this affidavit. VLT line games are displayed on the VLT screen. The first level of deception is that the VLT screen conceals how the line games actually work. Line games are controlled by the computer inside the VLT which uses a random number generator and various tables and algorithms to determine the result. What the player sees on the VLT screen is not the game itself. How the randomness is generated and the

probabilities of each winning combination are concealed from the player. The second level of deception is that the games are intentionally designed so that the 3x5 matrix on the VLT screen misrepresents the game to the player. Observing these intentional misrepresentations will lead the player to create incorrect perceptions of how the games work including incorrect perceptions of the nature of the randomness and true probabilities of the game.

37. The concealment coupled with the misrepresentations in VLT line games contrasts sharply with casino games, such as blackjack and roulette, in which the randomness and probabilities are transparent to the player. For example, when playing roulette, a popular table game in casinos, the player can see that the randomness is generated by the stopping position of a small ball which is rolled clockwise around a wheel that is spinning counter clockwise. In roulette the probabilities and payout for each type of wager are readily available to the player and are documented in many places such as on the internet and in books. Also, in roulette the player could calculate the probabilities based on observing the rules of the game. The game of roulette, like most card and dice games, is transparent to the player and does not include concealment and misrepresentations.

38. The random number generator in the computer in the VLT continuously generates thousands of random numbers per second. The outcome of a VLT line game is determined using the five most recent random numbers that are available the instant the player presses the "spin" button. The outcome of a spin is independent of previous or future spins. The random number generator and how it functions is concealed from the player and thus the player is ignorant about the fact that the outcome is determined the instant the "spin" button is pressed. Furthermore, the 5-6 second animation of the video reels and the stopping of reels in succession from left to right misrepresents the randomness as they give the player the incorrect perception that the randomness is somehow being determined as the reels animate and then stop from left to right.

39. The number of symbols on each of the five video reels is concealed from the player. Some games may have 64 symbols per reel for a total of over a billion possible outcomes (64x64x64x64x64 is 1.1 billion) whereas other games may have 40 symbols per reel for a total of 100 million possible outcomes. Other games may not have an equal number of symbols on each reel and could have the five reels with 32, 40, 44, 40, 32 symbols per reel yielding 72 million possible outcomes. The player is ignorant regarding the number of symbols per reel as the reels are concealed and any perceptions that the player has from observing the reels on the VLT screen would not correctly inform the player.

40. Video reels are weighted which means that the reels have more low paying symbols than high-paying symbols. The weighting of the reels is concealed from the player and thus the player is ignorant regarding the weighting of symbols per reel. The player cannot determine the weighting of the reels by observing the video reels on the VLT screen.

41. The fact that jurisdictions and testing labs accept weighted reels in EGM line games contrasts sharply with casino games. For example, in a card game or a dice game it would be unacceptable to have cards or dice that are weighted to have high paying outcomes occur less often.

42. The player can press "help" to see the payout amount for each combination of winning symbols. However, the number of occurrences of each winning combination is concealed from the player. For example, the odds of the jackpot can vary widely from, for example, 1 in 50,000 or 1 in 150,000 and this wide variation is concealed from the player.

43. When playing a VLT line game, the player first sees the animation of the video reels spinning. I have observed a slow motion videotape of a video slots game in Ontario and it is my observation and belief that the animations of the spinning reels do not reflect the configuration of the underlying video reels that are stored in tables in the computer. Having played the VLT line games in NL, it is my belief that the animated spinning reels work the same as in Ontario and do not

reflect the layout of the underlying video reels. It is my belief that the layout of the actual video reels, as stored in the tables in the computer in the VLT, is concealed and misrepresented by the animated spinning reels. Any attempt by the player to use the animated spinning reels to determine the layout of the actual video reels would lead to incorrect perceptions.

44. VLT line games in NL are labeled "five cent" games and it is true that a player could wager a total of only five cents per spin. On a 93% payback percentage game, a total wager of five cents would yield an average loss of 0.35 cents per spin (5 cents * 7% equals 0.35 cents). A player pressing spin every six seconds, or 600 spins per hour, would have an average loss of only $2.10 per hour. However, VLT line games are designed with multiple lines and inducements for maximum bet per line and players typically play much more than five cents per spin. When wagering the maximum amount (i.e. 25 cents) on all nine lines, the player's wager is $2.25 per spin which is 45 times higher than if the player had only wagered five cents on one line (0.05 times 45 equals 2.25). Higher wagers mean higher losses by the player. For example, a wager of 2.25 yields, on average, a loss per spin of 15.75 cents (7% of $2.25 is 15.75 cents) which is 45 times higher than the average loss of 0.35 cents when only five cents is wagered. Over the past seven years, I have watched players play slot machines and VLT line games for many hours and it is my belief that it is extremely uncommon for a player to bet only the minimum amount on only one line. The VLT line games in NL are represented as five cent games but this representation misrepresents that actual amount wagered by the player per spin and thus players incur up to 45 times more losses than if the game were truly a game on which players wagered five cents per spin.

VLT Line Games: Creating Near Misses using Asymmetric Reels

45. In the PAR Sheets for the slot machine games and video slot games that I have analyzed it is common for the games to be designed with asymmetric reels. Asymmetric reels are used to create near misses, failures that are close to wins.

Asymmetric reels create game outcomes in which high-paying symbols occur more often in non-winning combinations than in winning combinations.

46. VLT line games can be created with five symmetric reels and may, for example, have three jackpot symbols per reel represented as 3-3-3-3-3. This is a total of 15 jackpot symbols (3+3+3+3+3 equals 15). This produces a total possibility of 243 jackpots (3x3x3x3x3 equals 243). Game designers create asymmetric reels by manipulating the number of jackpot symbols per reel. For example, the first or last reel may have the most jackpots symbols with an overall configuration of the five reels of 6-1-2-2-4 or 1-4-2-2-6. In both cases there are still 15 jackpot symbols that the player will see but the number of jackpot wins has decreased from 243 to 96 (1x2x2x4x6 equals 96).

47. For many VLT line games, the winning symbols must line up from left to right. For example J-J-J-J-x pays the win for four jackpots whereas J-J-J-x-J pays for only three jackpots as there are only three jackpots lining up left to right. The use of asymmetric reels, within the left-to-right constraint for winning combinations, allows the game designer to manipulate the odds by showing many jackpot symbols but limiting the actual possibilities of the occurrence of winning jackpots. For example, limiting the number of jackpot symbols on the third and fourth reels, such as 5-4-1-1-4, allows the player to see 15 jackpot symbols but only 80 jackpots are available as reels three and four each have only one jackpot symbol.

48. Using asymmetric reels so that a disproportionately high number of high paying symbols are displayed in non-winning combinations is a form of near miss, a failure that is close to a win. I have documented in detail in my published papers that the creation of more near misses than would occur by chance alone has always been acceptable in Nevada, and most North American jurisdictions follow the lead of Nevada and approve EGM games that display a disproportionately high number of near misses.

49. In my papers, I show that there is a common misconception in the gaming industry that near misses do not exist in Nevada and elsewhere in North America. However, the only type of near miss to be banned in Nevada is a very specific type of near miss that has never been used by North American EGM manufacturers. That specific type of banned near miss was used briefly by a Japanese manufacturer in the 1980s.

50. I have studied over 100 slot machine and video slot PAR Sheets and the vast majority have a disproportionately high number of near misses. Having studied the history of near misses in North America, it is my belief that in NL the VLT line games may contain one or more types of near misses, including near misses created by asymmetric reels. The common misconception that near misses do not exist in EGM games in Nevada, and more generally in North America, misrepresents the fact that only one type of near miss has ever been banned in Nevada and that near miss was never used by any North American EGM manufacturers.

51. Through FIPPA I have been given the PAR Sheets for seven versions of the video slots game Lucky Larry's Lobstermania that are approved for use in Ontario. Lucky Larry's Lobstermania is also approved for use in NL. In all seven versions of Lucky Larry's Lobstermania in Ontario, the number of occurrences per reel of the highest paying symbol is 2-2-1-4-2, which means reel three is "starved" of the highest paying symbol. In all versions the chance of hitting the jackpot is 1 in 8,107,500. The PAR Sheets for the versions of Lucky Larry's Lobstermania currently used in NL will vary from the version in Ontario, as the games in Ontario are from a different supplier than the games in NL and NL has a jackpot limit of $500 which Ontario does not have. I have not seen the PAR Sheets for the version(s) of Lucky Larry's Lobstermania that is/are approved for use in NL.

VLT Line Games: Multiple Versions of the Same Game

52. In the slot machine PAR Sheets from Ontario that I have analyzed, multiple versions of the same game have been approved. There are nine approved versions

of the slot machine game The Phantom of the Opera and seven versions of the video slots game Lucky Larry's Lobstermania. These different versions of the same game all have different video reels and different payback percentages. However, they have the same winning combinations and the same payout amount for each winning combination and thus what the player sees on the VLT screen does not vary from one game version to another. The fact that there are multiple versions of the same game is concealed from the player.

53. The PAR Sheets I have from Ontario show that Ontario approves multiple versions of the same game and I believe that approving multiple versions of the same game is common industry practice, and thus I believe that NL approves multiple versions of the same VLT line game. The fact that there are different versions of the same game is concealed from the player. A player playing a line game on one VLT and then playing a different version of the same line game on another VLT would not know that the two games have different odds and different probabilities. The fact that the different versions of the same game appear to be the same is a misrepresentation of the fact that the games are different.

VLT Line Games: Bonus Feature

54. The bonus feature is invoked by a random event such as a certain symbol appearing on reels 1 and 5 on the same spin. The player always wins in bonus mode. A common type of win is a multiple of the original wager such as 2-5 times the original wager. This type of bonus encourages high wagers as the player knows that the bonus win is a multiple of the original wager and thus higher wagers yield higher wins. However, the overall loss for the player is higher per spin if he/she wagers higher amounts. For example, assume a 5 cent game with a 93% payback. A player wagering 5 cents on one line would lose on average 0.35 cents per spin (7% of 5 cents is 0.35 cents) whereas a wager of 15 cents on each of nine lines would be a total wager of $1.35 and would result on average in 27 times the loss or 9.45 cents per spin (7% of $1.36 is 9.45 cents).

55. Some games have free spins in bonus mode. I have studied PAR Sheets for video slots and observed that the video reels in bonus mode are normally significantly different than the video reels in the base game. The fact that they are different is concealed from the player. Any perceptions the player gets from the video reels in bonus mode will influence the player's perceptions of the layout of the video reels in the base game as the player has no way of knowing that they are different. Based on my analysis of video slot PAR Sheets, it is my belief that in NL the VLT line games would have video reels in base mode that are significantly different than video reels in bonus mode. This difference is concealed from the player and furthermore it is misrepresented in the 3x5 matrix on the VLT screen as the reels appear to be the same or similar but they may be significantly different.

56. In studying video slot PAR Sheets, I have observed that in bonus mode there may be various winning combinations that will occur under certain conditions but cannot occur under other conditions and this is concealed from the player. For example, it may be that three, or four, or five "Jacks" is a winning combination that can occur in the base game and in bonus mode. In bonus mode there may also be a special symbol that occurs randomly and if it occurs all wins are tripled. It may be the case that the bonus mode design is such that three, four, or five "Jacks" has zero probability of occurring at the same time as the special symbol occurs and thus there is zero probability that any of the three payouts for "Jacks" will ever be tripled. This limitation is concealed from the player and furthermore it is misrepresented as the 3x5 matrix does show that these combinations can occur without stating that they cannot occur when the special symbol is present. Based on my analysis of video slot PAR Sheets, it is my belief that VLT line games in NL may have winning combinations that are different in base mode and bonus mode and this difference is concealed from the player and furthermore it is misrepresented as the player can see the winning symbols occur but does not know that they cannot occur in combination with the bonus symbol.

57. VLT line games are games of chance and it is generally understood that the use of skill cannot affect the outcome or payback percentage. Each spin on a VLT line game is independent of all past and future spins. Thus, it is my belief that the probability of winning a progressive jackpot is dependent on the random number generator and the probability does not vary depending on the current amount of money in the jackpot. It is my belief that the player could use skill and select a game in which the jackpot has grown to $400 and this would increase the player's theoretical payback percentage compared to selecting a game in which the jackpot is much lower, say $100. Thus, it is my belief that the use of progressive jackpots introduces an element of skill for the VLT line game player.

VLT Line Games: Continuous Electronic Gaming (Churning Paradox)

58. VLT line games are a continuous form of gambling with one spin approximately every six seconds or 600 spins per hour. On average, a player who puts in $100 and wagers $2.25 every six seconds would have a balance of zero in the VLT in approximately one hour (on average, it is 634 spins or 63.5 minutes). That player would have, on average, won $1,346.50 for a total wagered in the hour of $1,446.50. Of the approximately 600 spins, 44 would have been paid for with the original $100 ($100 divided by $2.25 equals 44.4) and 556 spins would have been from churning through the $1,346.50 in wins. On average, the wins on this continuous form of gambling are approximately 13.5 times the original "coin-in" by the player. I refer to the fact that the gambler is continuously winning but the gamblers net amount steadily decreases over time as the "churning paradox".

59. On the PAR Sheets that I have analyzed, players win something quite frequently such as once in every ten plays. This is a Hit Frequency of 10%. When playing one line only, this means the player will win something, on average, every minute as there are 10 plays per minute. When wagering on all lines in a 20-line game, such as the Money Storm game in Exhibit B, a Hit Frequency of 10% would mean the player wins twice, on average, on every spin.

60. A typical payback percentage in Newfoundland is 93%-95%. On a game with a 94% payback percentage the player is losing, on average, 6% of every wager but is experiencing frequent, usually small, wins. For example, a common occurrence would be for the player to wager $2.25 and win $2.00. So the player has a net loss of $0.25, which is an 11% net loss on that spin, but has won $2.00.

61. Assuming a 93% payback percentage, a player wagering $2.25 would lose, on average, $0.16 per spin or approximately $96 per hour of play ($0.16 x 10 spins per minute x 60 minutes per hour).

62. The frequent wins of, on average, approximately 13.5 times the original wager provides the player with feedback that the player does win money from the game. However, it is a paradox that when the game is played as intended by the manufacturer, the player's balance steadily declines over time even though the reality is that the player is experiencing frequent wins.

Summary

63. VLT line games are controlled by a computer inside the VLT. What the player sees on the VLT screen conceals and misrepresents how the game actually works. The VLT screen:

(a) conceals how the randomness is generated;

(b) misrepresents how the randomness is generated;

(c) conceals the number of symbols per reel;

(d) conceals the weighting of symbols per reel;

(e) conceals the probability of winning each combination;

(f) contains animated spinning reels that do not represent the actual video reels that are stored in tables inside the computer;

(g) encourages maximum bet of up to 45 times the minimum bet and thus encourages 45 times increased losses by the player;

(h) displays asymmetric reels to create near misses in the form of a disproportionately high number of jackpot symbols in non-winning combinations and this is concealed from and misrepresented to the player;

(i) displays a version of the game that may be different than the same game on other VLTs and the fact that the two games are different but appear the same is concealed and misrepresented to the player;

(j) displays bonus modes which provide the player with choices and thus provide an illusion of control;

(k) displays bonus modes which use reels that are different than the reels in the base game and this difference is concealed from and misrepresented to the player;

(l) displays the bonus modes in which certain winning combinations cannot occur under certain situations and this limitation is concealed from and misrepresented to the player; and

(m) displays wins in a frequent and random reinforcement schedule which creates a "churning paradox" in that the player wins approximately 13.5 times the original amount inserted into the VLT while the net amount for the player continues to decline.

SWORN TO before me at the
City of Kitchener
in the Province of Ontario, this 18th.
day of December, 2007.

Kevin Harrigan

KEVIN HARRIGAN

MAPLE ANNE CAMERON

Exhibit A: Curriculum Vitae of Kevin Harrigan

Curriculum Vitae

KEVIN HARRIGAN

RR #1, Fergus, Ontario, Canada N1M 2W3
Tel: (519) 843-3130, Email: kevinh@uwaterloo.ca

EDUCATION

1996	PhD in Education (Computer Applications) Ontario Institute for Studies in Education, University of Toronto
1984	MSc in Computer Science University of New Brunswick
1982	BSc in Computer Science University of New Brunswick

EXPERIENCE

June 2006-Present — **Research Associate Professor, Applied Health Sciences**

- Conduct problem gambling research with the view that the published results can be used to inform public policy and ultimately to minimize the number of occurrences of gambling problems in Ontario and beyond. Research includes the study of the effects of:
  - Structural characteristics of Electronic Gambling Machines (EGMs)
  - Near Misses (failures that are close to wins)
  - Early wins (in various games but especially on EGMs)
  - Subliminal messaging on EGMs
  - The math and computer algorithms used in EGMs games (such as shuffling a virtual deck of cards and generating random numbers)
  - Applying psychological and rhetorical theories in an effort to explain why EGM players are so prone to having gambling problems.
- Act as an Expert Witness in legal cases involving EGMs.
- Consult with problem gambling organizations regarding the design of "responsible gaming" information for EGM players.
- Represent the University of Waterloo on the Waterloo Region Action Group on Gambling Issues.
- Conduct peer reviews for two problem gambling journals.
- Teach ARTS 303: Designing Learning Activities with Interactive Multimedia.
- Teach ARTS304: Computer Simulations and Computer Games for Learning

Jan 2002-June 2006 — **Research Associate Professor, Applied Health Sciences and Associate Director: Learning Objects Programs, Centre for Learning and Teaching Through Technology (LT3)**

University of Waterloo

- Teach ARTS 303: Designing Learning Activities with Interactive Multimedia.
- Teach ARTS304: Computer Simulations and Computer Games for Learning
- Conduct research on Learning Design.
- Conduct research on the design of gambling games.
- As the Associate Director: Learning Object Programs for LT3, perform various functions as needed such as Performance Reviews of employees, assist with LT3 budget, submit proposals for projects on and off campus, and in general assist with the management of LT3.
- Director of Ontario's Cooperative Learning Object Exchange (CLOE.on.ca). CLOE is a partnership of 28 Ontario Universities and Colleges and several other partners with a goal of sharing learning resources within Ontario and partnering with others to share across jurisdictions. For CLOE, directed a $360,000 Office of Learning Technologies funded project and a $342,000 Inukshuk Inc. funded project.
- Project Director representing Canada for MERLOT (www.merlot.org). MERLOT is a partnership of approximately 20 State systems and Canada. MERLOT is a free and open resource for sharing teaching and learning materials. MERLOT has 12,000 teaching materials with 1,200 having been peer reviewed. I negotiated to have the MERLOT International Conference 2003 in Vancouver and 2006 in Ottawa and I am the Chair.
- Was the Project Manager for the Community Building work package within eduSourceCanada (www.edusource.ca). eduSource was an $8,500,000 Canarie-funded project aimed at building a network of Learning Object Repositories in Canada. The Community Building budget was approximately $1.3 million and involved partnerships with our CLOE partners, Laval University and Apple Canada.
- Manage various projects such as a current $50,000 Industry Canada funded project investigating the use of the IMS Learning Design specification (imsproject.org) and a $100,000 project to put Career Services workshops online.
- Manage the development of Learning Objects on the University of Waterloo campus which typically involves hiring and managing several co-op students per semester.

May 2000-
Jan 2004

Part Owner and Vice President of Multimedia Research and Development
Game Planit Interactive Corp.

- Game Planit is a company that builds educational multimedia software related to problem gambling (www.gameplanit.com).
- Conceptualized and managed all phases of the design and production of educational software including the CD "Safe@play Slot Machine Tutorial" which is used by addictions counsellors across North America.
- Was in charge of all entrepreneurial and business activities including: negotiated Angel financing of $640,000, legal issues, accounting issues, manage investor relations, managed employees and subcontractors, and directed strategic planning.
- Was the Co-Principle Investigator for a $135,000 research project funded by the Ontario Problem Gambling Research Centre.

April 1998-
April 2000

Research Assistant Professor
TeleLearning Network of Centres of Excellence and
Department of Computer Science, University of Waterloo

- Project manager for various software development projects.
- Researched topics in Human Computer Interaction and Multimedia.
- Taught the Independent Studies course IS301a: Designing Learning Activities with Interactive Multimedia.
- Taught the Computer Science graduate course: Emerging Methods for Human-Computer Interaction.
- One semester, taught CIS4300 Human Computer Interaction for Computing and Information Science at the University of Guelph and supervised one fourth-year student on his fourth-year project.

Sept. 1997-
Mar. 1998

Vice President of Operations
RedLine Interactive Corp, Waterloo

- Managed all issues related to the management of the production of a training application using CD-I technology for RedLine's only major client. Note that RedLine did not have a President and thus as Vice-President I was the head of the company. RedLine went bankrupt in February 1998, and I managed the shut-down of RedLine.

Jan 1997 -
Aug 1997

Dept Head, Learning Technologies Department and
Provincial Multimedia Centre of Excellence
New Brunswick Community College - Miramichi

- Responsibilities included most aspects of managing the department including but not limited to: managing all computer labs and technology within the department, human resources, budget, curriculum, project placements, marketing, and liaison with many external companies and organizations. The new Multimedia Centre of Excellence is a key element in the New Brunswick government's vision of becoming a "high-tech province". The Centre has approximately 20 instructors and a capacity for 240 full-time students. The programs included: Game Design, Multimedia, Instructional Design, Virtual Reality, and Artificial Intelligence.

July 1995 -
Dec 1996

Instructor, Learning Technologies Department and
Provincial Multimedia Centre of Excellence
New Brunswick Community College - Miramichi

- Taught several courses in the Learning Technologies department including: Computer Human Interaction, Computer Programming, Instructional Design, and Psychology of Learning.

- Coordinated 20 student teams who were doing off-campus projects.

1991-
1995

Assistant Professor
Department of Physics and Computing,
Wilfrid Laurier University

- Taught various courses using IBM PCs and Unix-based minicomputers. Software included DOS, UNIX, VMS, FORTRAN, C, dBASE IV, Lotus, SPSS, 68000 ASSEMBLER, ToolBook, HyperCard, and Authorware Professional. Courses included: "Introduction to Programming", "Information Systems with Microcomputer Systems", "Microprocessor I", "Database I", "Software Engineering", and "The Design of Interactive Multimedia Systems".
- Coordinated the Internship Program and the Professional Experience Program.

- Supervised fourth-year students on their undergraduate projects. One student won an international award.

July 1988 - June 1991 **Manager of Computing Services**
Faculty of Administrative Studies, York University

- Major function was to manage the strategic deployment of information technologies throughout the Faculty.
- Coordinated support and development for all users within the Faculty. This included: 70 full-time faculty members, 1200 Full Time Equivalent BBA, MBA and PhD students, and several groups which are affiliated with the Faculty such as the Ontario Centre for International Business.
- Managed the redevelopment of several administrative applications.
- Supervised 2.5 technical staff members and a 1.5 staff member for word-processing support. Often hired temporary employees for special projects. Supervised four full-time student advisors in cooperation with York Central Computing.
- Responsible for a wide variety of hardware and software including but not limited to the following: DEC VAX 6230, IBM Token Ring Local Area Network, Apple MACs, Ethernet Local Area Network, VMS, DOS, MVS/JCL, Novell Netware, Rally, CDD/Plus, Rdb, FORTRAN, PL/1, C, SAS, SPSS, Minitab, WordPerfect, TEX, PostScript, Harvard Graphics, Lotus, Excel, TCP/IP, Micom Interlan Gateway and Windows.
- Responsible for Computing Services budget.
- Taught one section of the two semester course "Introduction to Computer Science" for non Computer Science majors.

May 1987- July 1988 **Systems Consultant**
Digital Management Group, Toronto

- Coordinated Canadian software support and training for the UserBase fourth generation programming language on DEC computers.
- Developed applications in UserBase for clients.
- Taught approximately seven days per month.

April 1986- May 1987 **Manager of Computer Applications**
Medicine Hat College

- Acted as the system manager for a VAX 750 and a VAX 780 running under VMS. This included setting up accounts, liaison with DEC for hardware and software support, installing new software, and related duties.
- Provided software support and development for all administrative applications using various VAX, PC and DEC Rainbow software.
- Supervised several part-time computer staff..

Nov. 1985- April 1986 **Instructor**
Medicine Hat College, Alberta

- Taught university transfer Computer Science courses on a VAX 780 and IBM PCs including "Systems Analysis and Design", "Data Structures" and "Microcomputer Hardware".

Sept. 1983- June 1985 **Lecturer**
University of New Brunswick

- Taught various courses using IBM PCs in the JANET network and an IBM 3081 mainframe under MVS. Software included BASIC, FORTRAN, COBOL, JANET network software, Lotus 1-2-3, Symphony, dBASE II and ASSEMBLER.
- Courses taught included "Introduction to Computer Science", "Computer Science Concepts", "Microcomputer Applications" and "COBOL Programming".
- Supervised ten fourth year students on their undergraduate projects.
- Coordinated three multi-section courses.

April 1980-
May 1982

Programmer, University of New Brunswick
(16 months part-time. 8 months full-time.)

- Programmed in SAS under MVS on a database set up for the New Brunswick Alcohol and Drug Dependency Commission.

PUBLICATIONS

Refereed Journal Publications

Harrigan, K. A. (in press). Slot Machines: Pursuing Responsible Gaming Practices for Virtual Reels and Near Misses. International Journal of Mental Health and Addiction.

Harrigan, K. A. (2007). Slot machine structural characteristics: Creating near misses using high symbol award ratios. International Journal of Mental Health and Addiction, DOI 10.1007/s11 469-007-9066-8. Online First version.

Harrigan, K. A. (2007). Slot Machine Structural Characteristics: Distorted Player Views of Payback Percentages. Journal of Gambling Issues. June, 2007.

Schoner, V., Buzza, D., Harrigan, K. & Strampel, K. (2005). Learning Objects in Use: 'Lite' Assessment for Field Studies. Journal of Learning Technology. 1(1).

Buzza, D., Richards, L., Bean, D., Harrigan, K. & Carey, T. T. (2005). LearningMapR: A Prototype Tool for Creating IMS-LD Compliant Units of Learning. Journal of Interactive Media in Education. Special Issue: Advances in Learning Design. [http://www-jime.open.ac.uk/2005/17/].

Buzza, D., Bean, D., Harrigan, K. A. & Carey, T.T. (2004). Learning Design Repositories: Adapting Learning Design Specifications for Shared Instructional Knowledge. Canadian Journal of Learning Technologies, 30(3)

Rory McGreal, Terry Anderson, Gilbert Babin, Stephen Downes, Norm Friesen, Kevin Harrigan, Marek Hatala, Doug MacLeod, Mike Mattson, Gilbert Paquette, Griff Richards, Toni Roberts, Steve Schafer. (2004). eduSource: Canada's learning object repository network. United States Distance Learning Association (USDLA) Journal, March. Retrieve Nov 14 2006, from http://www.itdl.org/Journal/Mar_04/article01.htm

Harrigan, K. A. (2000). The SPECIAL System: Searching Time-Compressed Digital-Video Lectures. Journal of Research on Computing in Education 33(1).

Carey, T.T., Harrigan, K. A., Palmer, A., & Swallow, J. (1999). Scaling up a learning technology strategy: Supporting student/faculty teams in learner-centered design. ALT-J, the Journal of the Association of Learning Technologies 7(2), 15-26.

Harrigan, K. A. (1995). The SPECIAL System: Self-paced education with compressed interactive audio learning. Journal of Research on Computing in Education, 27(3), 361-370.

Book Chapters

Light, T. P. , Harrigan, K. A. , Bingelson, L., & Carey, T. T. (2007). Collaboration and Community Building Extending Instructional Design Models for Learning Objects to Foster Reusability. In A. Koohang & K. Harman (Eds). Learning Objects and Instructional Design (pp. 51-84), Santa Rosa, California: Informing Science Press.

Published Conference Publications

Burns, C. M., Barsalou, E., Handler, C., Kuo, J., and Harrigan, K. (2000), "A work domain analysis for network management," Proceedings of the IEA 2000/HFES 2000 Congress, vol. 1, pp. 469-471.

Carey T.T. & Harrigan, K.A. (2000). The 7 C's model for Learnware development. In Proceedings of ED-Media'00 World Conference on Educational Multimedia and Hypermedia, 1249-1250. Montreal. Association for the Advancement of Computing in Education.

Harrigan, K.A. (2000). Time-expanded audio for learning. In Proceedings of ED-Media'00 World Conference on Educational Multimedia and Hypermedia, 1323-1324. Montreal. Association for the Advancement of Computing in Education.

Harrigan, K. A. (1999). DUKES: Creating real-time variable-speed speech for use in educational multimedia. In Proceedings of ED-Media'99 World Conference on Educational Multimedia and Hypermedia, 1360-1361. Charlottesville, VA: Association for the Advancement of Computing in Education.

Harrigan, K. A. (1999). Applying theories used in drama to the design of educational multimedia. In proceedings of ED-Media'99 World Conference on Educational Multimedia and Hypermedia, 1314-1315. Charlottesville, VA: Association for the Advancement of Computing in Education.

Carey, T. T., Harrigan, K. A. & Palmer, A. (1998). Mediated Conversations for cognitive apprenticeship. In proceedings of International Conferences on the Learning Sciences, 299-301. Atlanta, GA: Association for the Advancement of Computing in Education.

Harrigan, K. A. (1995). Using keying-contingent sounds to reduce mode errors in human-computer interaction. In Proceedings of the Second Groningen International Technology Conference for Students, 79-84. The Netherlands: University of Groningen.

Harrigan, K. A. (1995). The intelligibility of time-compressed digit-video lectures. In Proceedings of the Sixth International Conference on Human-Computer Interaction, 61-66. Tokyo: Elsevier.

Harrigan, K. A. & McLean, R. (1995). Effects of time-compression and iconic indexing of digital-video lectures. In Proceedings of ED-MEDIA'95: World Conference on Educational Multimedia and Hypermedia, 295-300. Charlottesville, VA: Association for the Advancement of Computing in Education.

Harrigan, K. A. & Gujar, U. G. (1984). Interactive computer graphics under VSPC FORTRAN. In Proceedings of the Annual APICS Computer Science Conference, 130-139. New Brunswick, Canada: University of New Brunswick.

Non-Published Presentations

Harrigan, K. A. (2007). The Future of Learning Object Repositories: Considerations for Continuing Education. Canadian Association for University Continuing Education. Online presentation. March 27.

Sranacharoenpong, K., Hanning, R., Smitasiri, S., Harrigan, K., Richards, L. Hutamai, S. & McLaughlin, J. (2007). Application of learning technologies to support community-based lay health care workers and build capacity for chronic disease prevention in Thailand. 19 IUHPE World Conference on Health Promotion and Health Education. Vancouver, June 10-15.

Harrigan, K. A. (July 2004) MERLOT: The Advantages of Sharing. Panel at the Association for Theatre in Higher Education annual conference: Inspiring Theatre: networking our Global-Local Resources. Toronto.

Harrigan, K. A. (June 2004) CLOE: A Repository of Free Peer-Reviewed Learning Objects , Canadian Association of Distance Education annual conference: Pioneers in a New Age, York University, Toronto.

Howard Rose, D. & Harrigan, K. A. (February 2004) Reusable Learning Designs to meet Instructional Challenges. Teaching, Learning and Technology Conference – 2004 Series: The Educational Chrysalis: Exploring Processes of Innovation in University and College Teaching. Ottawa.

Hanly, G, A., McMartin, F.& Harrigan, K.A. (2004) Scaling the Quality Evaluation of Learning Objects: MERLOT's Peer Review Process. New Learning Ecosystems. National Learning Infrastructure Initiative (NLII). San Diego.

Harrigan, K. A. (November 2003). MERLOT and other Learning Object Repository Initiatives: Their *Raisons d'Être*, Learning Effectiveness, Cost Effectiveness, and Sustainability, State University of New York (SUNY), Saratoga Springs, New York.

Harrigan, K. A. (November, 2003). Community Building in CLOE. McGraw-Hill Ryerson Conference: Active Learning: Connect, Engage and Integrate. Ryerson University, Toronto.

Harrigan, K. A. (October, 2003). CLOE Case Stories and Learning Impact Studies. NLII Focus Session "Learning Objects", Columbus, Ohio.

Harrigan, K. A. (October, 2003). Ontario's Co-operative Learning Object Exchange and the Clarica Scholars Program. Learning Objects: An initial response by the Saskatchewan Education Sector. University of Saskatchewan. Saskatoon.

Harrigan, K. A. (October, 2003). How does the CLOE repository facilitate the reuse of learning materials ? Learning Repositories Summit, Academic ADL C0-Lab, University of Michigan.

Harrigan, K. A. (August, 2003). CLOE Case Stories posters. MERLOT International Conference, Vancouver.

Harrigan, K. A. (August, 2003). Community building in CLOE. Ontario Parnerships for the Advancement of Skills (OPAS): Summer Institute. Toronto.

Harrigan, K. A. (July, 2003) CLOE: A Learning Object Repository for you. McMaster University. Hamilton, Ontario.

Harrigan, K.A. (July, 2003). CLOE and CLOE@Queens. Queens University. Kingston, Ontario.

Harrigan, K. A. (July, 2003) The CLOE Repository and IMS Standards. eduSpecs Learning Object Repository Summit. Vancouver.

Harrigan, K. A. (June, 2003). Western's Commitment to CLOE: A Win-Win Situation. University of Western Ontario. London, Ontario.

Harrigan, K. A. (June, 2003). CLOE: A practical discussion and workshop, University of Windsor. Windsor, Ontario.

Harrigan, K. A. (June, 2003). CLOE's Community Building Exercise. eduSource Industry Forum. Moncton, New Brunswick.

Harrigan, K. A. (May, 2003). Keynote Address: What are learning objects and how can they be used to enhance students' learning? Pathways to the Future, Seneca College, Toronto.

Harrigan, K. A. (May, 2003). An Introduction to CLOE: Ontario's Co-operative Learning Object Exchange. The Nexus Conference: Connecting Teaching, Technology, and Inclusive Learning, University of Toronto.

Carey, T.T. & Harrigan, K. A. (2003). CLOE: A New Repository for Ontario Universities. Colloquium series. University of Toronto

Harrigan, K. A. (March, 2003). CLOE's Community Building Exercise. eduSource Industry Forum. Toronto.

Harrigan, K. A. (March, 2003). An Introduction to CLOE: Ontario's Co-operative Learning Object Exchange. Lakehead University. Thunder Bay, Ontario.

Harrigan, K. A. (March, 2003). An Introduction to CLOE: Ontario's Co-operative Learning Object Exchange. Teaching and Technology Advisor Board and Colloquium Series, University of Western Ontario. London, Ontario.

Penny Light, T., Bringelson, L., Carey, T. T. & Harrigan, K. A. (August, 2002). Learning About Learning: Engaging Teachers/Learners in Learning Object Design. MERLOT International Conference 2002, Atlanta.

Harrigan, K. A., Carey, T. T. & Salter, D. (August, 2002). An Instructional Design Model for Learning Object Re-Use. MERLOT International Conference 2002, Atlanta.

Horbay, R. & Harrigan, K.A. (2001). A comprehensive problem gambling prevention strategy. Canadian Gaming Summit. Toronto.

Turner, N. & Harrigan, K.A. (2001). Fun with numbers: How slot machines really work and other facts about gambling. Canadian Foundation on Compulsive Gambling, Innovation 2001 Conference. Toronto.

Carey, T. T. , Harrigan, K. A., & Holland, S. (1999). Enhancing Interaction Scenarios with Domain-Oriented Visualizations. Poster presented at Interact'99: Seventh IFIP Conference on Human-Computer Interaction, Incorporating HCI. Cambridge, England.

Harrigan, K. A., Boyle, K. & Horbay, R. (1999). Problem gambling: What does the research show about how we can minimize the risk? Canadian Institute for Chartered Accountants: Canada Gaming '99, Niagara Falls.

Harrigan, K.A., & Carey, T. T. (1998). Results that surprise: Mediated conversations for cognitive apprenticeship. Panel presentation at TeleLearning'98 in Vancouver.

Harrigan, K.A., & Carey, T. T. (1998). Mediated conversations for cognitive apprenticeship. Poster at TeleLearning'98 in Vancouver.

Carey, T. T., & Harrigan, K.A. (1998). TeleCHI poster. TeleLearning'98. Vancouver.

Carey, T. T., Swallow, J., Palmer, A., & Harrigan, K. A. (1998). A learner-centred design kit for student/faculty teams. Paper presented at the ALT-C conference. Oxford, England.

Harrigan, K. A., Boyle, K. & Horbay, R. (1998). safe@play: A comprehensive prevention strategy for problem gambling. Presented at Evolving Treatment & Prevention Practices: An Interprovincial Conference on Problem Gambling. Edmonton, Alberta.

Harrigan, K. A. (1997). Learning Technologies at NBCC: Miramichi. Presented at LearnTec'97. Miramichi, New Brunswick.

Harrigan, K. A. (1996). Using speeded-up audio and speeded-up video in educational multimedia. Presented at LearnTec'96. May 8-10, 1996. Miramichi, New Brunswick.

Other Publications

Carey, T. T. & Harrigan, K. A. (in press). Article on User Interface. McGraw-Hill Encyclopaedia of Science and Technology.

Horton, K., Harrigan, K. A., Horbay, R., & Turner, N. (2002). The Effectiveness of Interactive Problem Gambling Awareness and Prevention Programs. Report of Research Project to the Ontario Substance Abuse Bureau Ministry of Health and Long-Term Care, 2000-2002. Available at: http://www.gamblingresearch.org/contentdetail.sz?cid=2371&pageid=1192&r=s

Other contributions

CBC radio. (2007). Interviewed as an expert on EGMs regarding whether EGMs are programmed to contain subliminal messaging.

CKLW radio Windsor (July 2004) Interviewed as expert on Slot Machine fraud.

Schloss Dagstuhl, Research Centre for Computer Science, Germany (June 2000). This centre invited 40 top researchers in the world in Multimedia to present in a weeklong workshop. I was one of the 40.

University of Guyana (August 1999). Presentation to professors, university administrators, and senior government officials including the Prime Minister. Topic was how to use technology to allow the University of Guyana to offer their courses to many more potential students in the country.

University of Waterloo Master's Thesis/Project Reader

Boucher, Janelle (2003). Usability and Functionality Characteristics and Tradeoffs Within a Specific E-Learning Framework. Masters Thesis in Management Sciences.

Palmer, Antonia (2003). Case Stories: Promoting Learning Through Storytelling in an Online E-Learning System. Masters Thesis in Systems Design Engineering.

Roushas, Georgios (2003). Evaluation of User Interfaces to Software Agents for Courseware Management. Masters Project in Management Science.

Xiaohui, Liang [Maggie] (2002). A Design Experiment on Students' Perceptions of a Knowledge Management System. Masters Thesis in Management Science.

Jin, Lei (2002) The Impact of Co-Operation Policies on Participation in Online Learning Object Exchange. Masters Thesis in Management Science.

Supervision of 4th Year Computer Science Student Projects

Have supervised approximately 20 students on their undergraduate 4th year Computer Science projects at the University of New Brunswick, University of Guelph, and Wilfrid Laurier University. One project won an international award.

Multimedia Judging

Judge for the Ontario Skills Competition Website Awards 2004.

Judge for the New Brunswick provincial Multimedia Awards 2003.
Judge for Canadian National Skills Competition Website Awards 2003

Expert Witness re Gaming

Expert Witness for the legal firm Boies, Schiller, and Flexner LLP regarding the computer programming of Video Poker machines and electronic Slot Machines. Bois, Schiller, and Flexner represented the defendants in United States District Court of Nevada, Poulos et. al. (plaintiffs) vs Ceasar's World et. al. (defendants), CV-S-94-1126-RLH (RJJ) (Base File).

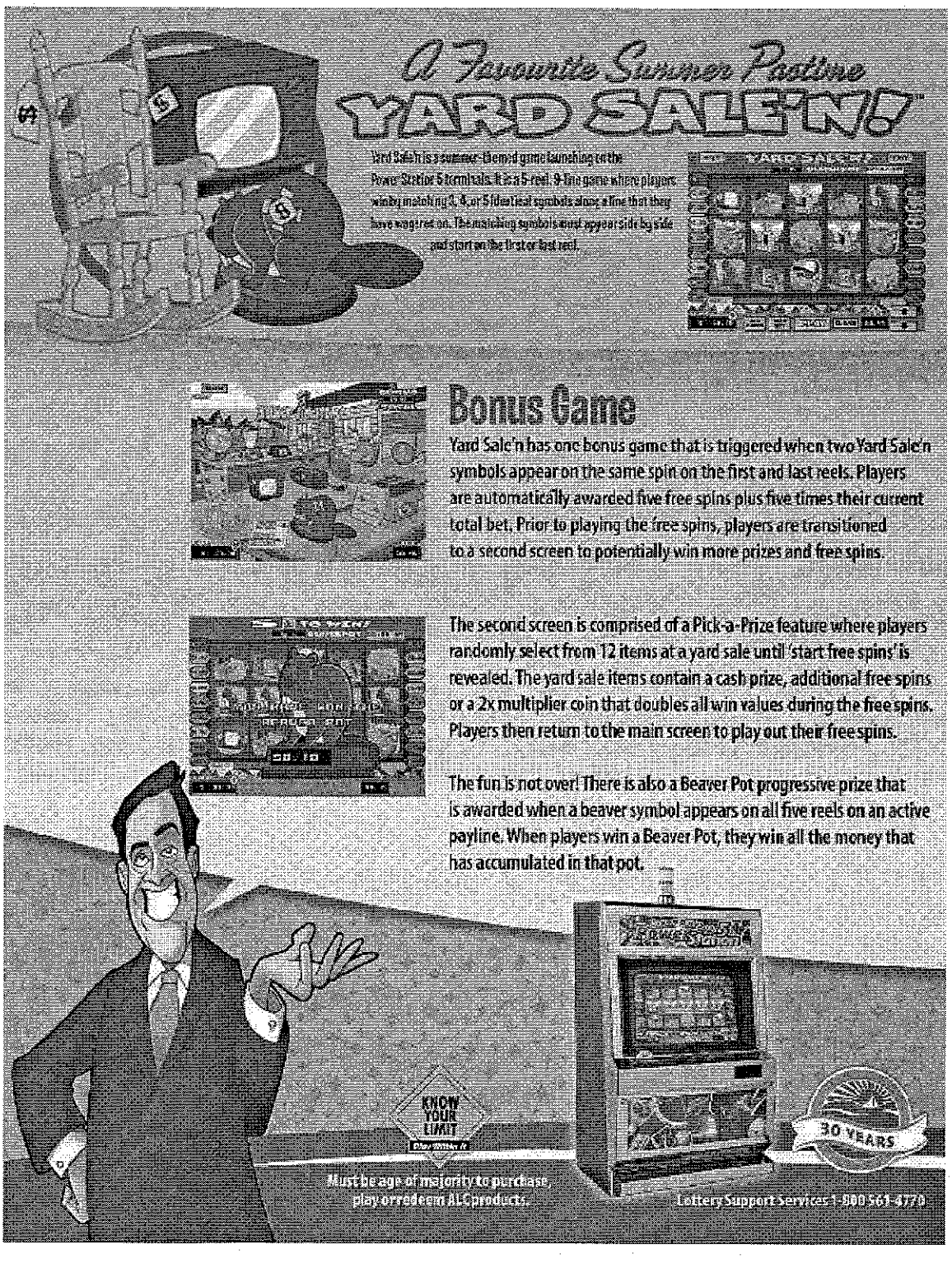
Expert Witness for Zues Yaghi, Defendant and Plaintiff by Counterclaim, regarding the computer programming of Video Poker machines. Action Number 003 03707, WMS Gaming vs Zues Yaghi, in the Court of Queen's Bench of Alberta, Jurisdiction of Edmonton.

Expert Witness for the legal firm Fancy Barristers regarding the design of "Blazing 7's" slot machines and the potential of the misrepresentations of the machines regarding gambling addictions especially as it relates to medication for Parkinson's Disease. Treyes v. Ontario Lottery and Gaming Corp.

Research Grants

2008-2012	Pinciple Investigator. $500,000. Multi-disciplinary Perspective on Forms of Bias in Gambling Environments as Indirect Risk Factors for Problem Gambling. Five-year Emerging Team Grant. Ontario Problem Gambling Research Centre.
2007	Principle Investigator. $42,000. Gap Analysis: Structural Characteristics of EGMs as Indirect Risk Factors for Problem Gambling versus the Gaming Regulations. Ontario Problem Gambling Research Centre.
2007	Co-investigator. $10,000. An Intervention for 'Exceeding Your Limits' on Slot Machines. Ontario Problem Gambling Research Centre. Ontario Problem Gambling Research Centre.
2006	Principle Investigator. $10,000 An investigation of slot machine nudges. Ontario Problem Gambling Research Centre.
2005-2006	Co-Principle Investigator. $80,000 LearningMapR project to investigate the use of IMS Learning Design. Industry Canada.
2005-2006	Principle Investigator. $333,500 grant from Inukshuk Inc. for the development and evaluation of Learning Objects across 19 Ontario post-secondary institutions who are members of CLOE. Title: Inukshuk Fellowships for Multimedia Learning Content: A program of the Co-operative Learning Object Exchange
2002-2005	eduSourceCanada. Manager of the $1,500,000 Community Building package within the $8,500,000 eduSource Canada Project. eduSource built a testbed of linked and interoperable Learning Object Repositories across Canada.
2002-2004	Office of Learning Technology: Manager of $364,000 grant to develop Learning Objects and Case Stories of reuse.
2002-2003	Co-Principal Investigator of $400,000 grant from the Tula Foundation to support research related to Community Building in CLOE (cloe.on.ca) .
2002-2002	Co-Principle Investigator for a $135,000 research project funded by the Ontario Problem Gambling Research Centre. Title: The Effectiveness of Interactive Problem Gambling Awareness and Prevention Programs.

Exhibit B: Promotion Flyers for Four VLT Line Games

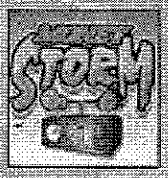

A Favourite Summer Pastime
YARD SALE'N!
Yard Sale'n is a summer-themed game launching on the Power Station 5 terminals. It is a 5-reel, 9-line game where players win by matching 3, 4, or 5 identical symbols along a line that they have wagered on. The matching symbols must appear side by side and start on the first or last reel.
Bonus Game
Yard Sale'n has one bonus game that is triggered when two Yard Sale'n symbols appear on the same spin on the first and last reels. Players are automatically awarded five free spins plus five times their current total bet. Prior to playing the free spins, players are transitioned to a second screen to potentially win more prizes and free spins.
The second screen is comprised of a Pick-a-Prize feature where players randomly select from 12 items at a yard sale until 'start free spins' is revealed. The yard sale items contain a cash prize, additional free spins or a 2x multiplier coin that doubles all win values during the free spins. Players then return to the main screen to play out their free spins.
The fun is not over! There is also a Beaver Pot progressive prize that is awarded when a beaver symbol appears on all five reels on an active payline. When players win a Beaver Pot, they win all the money that has accumulated in that pot.
KNOW YOUR LIMIT
30 YEARS
Must be age of majority to purchase, play or redeem ALC products.
Lottery Support Services 1-800 561-4770

Money Storm

Money Storm is a new five-reel, 20-line game with a strong animated theme featuring farm animals, whirlwinds, and money storms. You win by matching symbols on consecutive reels on an active payline (according to the paytable).

Two Bonuses in Money Storm

The Weather Beacon Bonus is initiated when the Weather Beacon symbols align on reels three, four and five. You can instantly win from two to 25 times your initiating wager.



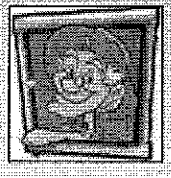
Weather Beacon

The Free Storm Scatter Bonus is initiated when three or more Tornado symbols appear on an active payline on consecutive reels, beginning on the far left. You win cash and free spins based on the number of Tornado symbols appearing. During the bonus round all symbols turn to scatter pays and cash is awarded for scatter symbols falling anywhere on the reels.

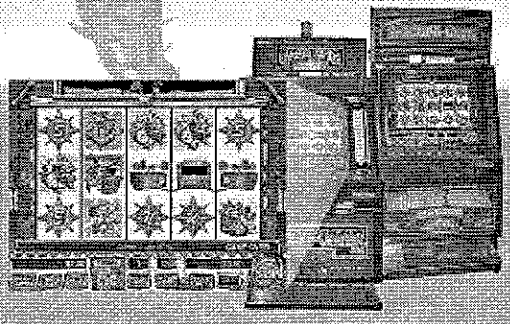
Tornado

And here's a bonus within the bonus! While in the Free Storm Scatter Bonus, you can trigger the Weather Beacon Bonus and also re-trigger the Free Storm Scatter Bonus! The Free Storm Scatter Bonus ends after 200 free games have been played or when there are no remaining free games.

Watch out for the friendly Farmer scatter pay symbol. Scatter pays are paid in addition to line and bonus wins.



Farmer



You can find this stormy game on the **IGT Select-a-Game** and **Game King** terminals.

Lottery Support Services 1-800-561-4770

www.alc.ca


Feels like a
Canadian Summer™
Your players can look forward to summer by playing
the new Canadian Summer game on the Power Station 5 terminals.
Canadian Summer is a 5-reel, 9-line game where players win by matching 3, 4, or 5 identical symbols along a line that they have wagered on. The matching symbols must appear side by side and start on the first or last reel.
Bonus Game
This summer-themed game has one bonus which is triggered when three Sun symbols appear on the same spin on the first, middle and last reels. In the bonus, players Pick-a-Prize by randomly selecting question marks. If a question mark contains a dollar amount, the player wins that prize. If the question mark contains a Sun symbol, the multiplier thermometer will increase by one. Then, all subsequent dollar amounts revealed will be multiplied by the amount on the thermometer.
KNOW YOUR LIMIT
30 YEARS
Must be age of majority to purchase, play or redeem ALC products.
Lottery Support Services 1-800 561-4770

HEXBREAKER

HooDoo the black cat will help you navigate through the eerie superstition symbols in this new five-reel, 13-line game.

You win by matching symbols on consecutive reels on an active payline (according to the paytable). This game pays both ways, from left to right or right to left.

Look for the Hexbreaker Wild symbol that substitutes for other symbols (except bonus initiators and scatter symbols).

Being jinxed is a good thing with the Hexbreaker game! Jinx symbols are scatter symbols. Finding three, four or five in any reel position pays! Keep in mind, only the highest scatter win is paid in each game.

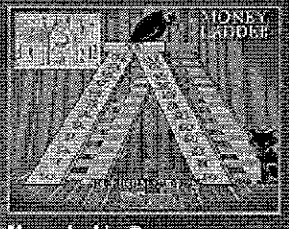
HooDoo the black cat

Hexbreaker Wild

Jinx

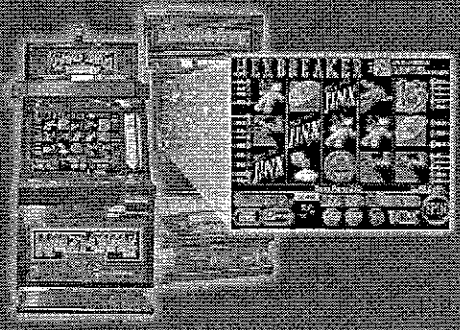
Let's Climb the Money Ladder!

If two Money Ladder symbols appear in any position on the second and fourth reels, you and HooDoo will climb the Money Ladder. First, touch the Fortune Board to determine how many steps HooDoo will move up the ladder. The value of the step HooDoo lands on is added to the Bonus Win Meter, then the step turns into a Crow. Continue to touch the Fortune Board and move HooDoo up the ladder. If HooDoo climbs over the ladder then crosses underneath, the value of the remaining steps increment by one times the total initiating bet. The Money Ladder Bonus ends when HooDoo lands on the 13th step or on one that has been turned into a Crow.



Money Ladder Bonus

Have fun with Hexbreaker on the IGT **Select-a-Game** and **Game King** terminals. It's not as scary as you think!



Lottery Support Services 1-800-661-4770

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Exhibit C: Sample Layout of a Nine-Line VLT Line Game

The game outcome is a 3x5 matrix of 15 symbols which are labeled here as a-o:

a	b	c	d	e
f	g	h	i	j
k	l	m	n	o

In a nine-line game the player can wager on nine lines as follows:

Three are straight lines:

1) a-b-c-d-e
2) f-g-h-i-j
3) k-l-m-n-o

Two are 'V' and inverted 'V' shaped:

4) a-g-m-i-e
5) k-g-c-i-o

Two are as follows:

6) f-b-c-d-j
7) f-l-m-n-j

Two are as follows:

8) a-b-h-n-o
9) k-l-h-d-e

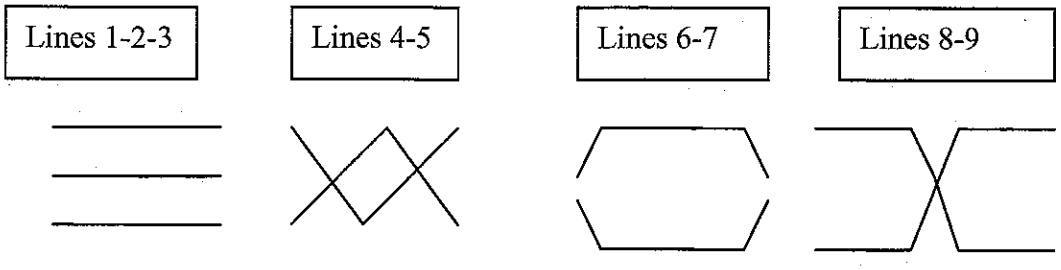

Exhibit D: Sample Video Reels

	R1	R2	R3	R4	R5
1	B	M	C	M	L
2	E	A	K	H	K
3	C	L	J	J	H
4	F	H	H	K	F
5	D	C	G	L	E
6	G	M	D	M	L
7	H	B	J	J	A
8	A	D	M	K	H
9	J	E	H	M	K
10	E	H	E	G	L
11	L	M	K	H	F
12	K	F	J	M	J
13	C	G	D	K	L
14	M	K	F	D	M
15	J	M	M	F	C
16	B	A	K	M	L
17	M	L	H	K	H
18	D	M	G	D	K
19	L	E	J	J	J
20	F	B	A	L	L
21	B	C	M	K	F
22	K	M	J	M	B
23	E	J	C	J	L
24	M	F	D	A	J
25	A	A	J	H	E
26	L	M	K	C	L
27	C	H	L	J	G
28	E	L	J	L	H
29	H	J	E	K	K
30	B	M	G	M	J
31	G	G	L	E	L
32	C	B	H	F	M
33		H	J	M	H
34		L	M	H	D
35		K	F	K	L
36		G	D	L	K
37		F	G	B	F
38		E	K	H	J
39		C	B	G	
40		D	H	K	

There are five reels. The reels have a different number of symbols. The letters correspond to some symbols such as a "Cherry".