Development of An On-line Gaming Tutorial

Texas Hold'em PRO Accelerator

by

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ABSTRACT

This research paper examines the feasibility of developing an on-line gaming tutorial for the poker game known as Texas Hold'em. The rules of Texas Hold'em make it an easy game to learn. However, the complex nature in which the game is played can make it very difficult for players to master. The research paper discusses many of the winning concepts and strategies employed by the games top professionals. In addition to the review of literature regarding Texas Hold'em, major emphasis was also placed on the topics of problem solving and decision making, taxonomy, and e-Learning.

The examination of problem solving and decision making revealed that many of the tools and techniques used within that discipline could be applied to playing Texas Hold'em. The study also concluded that taxonomy for Texas Hold'em does exist. This taxonomy revolves around the three mental processes that Hold'em players use to determine if they should initiate involvement or remain engage in the play of a hand. During this process, players will use their understanding of probabilities, responsiveness, and obfuscation to play the game. Additionally, the review of e-Learning principles did

establish that Texas Hold'em is a subject well suited for on-line learning. No tutorial has been developed, however some preliminary recommendations for subject matter were identified.

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Chapter I: Introduction

This research activity concerns the poker game known as Texas Hold'em, problem solving and decision-making, the concept of taxonomy, and e-Learning principles. Each of these topics in and of themselves constitutes a vast area of study. Therefore, it should be noted that the literature review and subsequent analysis of the topics is not intended to be an exhaustive. Rather, the review of this subject matter is intended to determine if a basic understanding of these themes can assist in the fulfillment of the goals and purpose of this study. For a greater understanding concerning any of the major topics, the referenced sources can be of great assistance.

The modern day versions of poker currently being played in the United States and other parts of the world have been around for the better part of a century (Poker, 2005). Although there are many vaiations of poker currently being played, this research activity focuses on the game of Texas Hold'em. The game known as Texas Hold'em, or Hold'em, has recently experienced interest levels never before seen (World Poker Tour, 2005). The sheer number of broadcasts that highlight Hold'em is evidence of its rise to prominence. There were over 160 televised Hold'em events in the month of December 2005 alone (Poker On TV, 2005). What is more, people are watching the broadcasts. The viewing numbers for Hold'em are staggering (World Poker Tour, 2005). Some broadcast ratings now rival those of other mainstream sporting events.

Hold'em events today are dominating a number of the cable airwaves. According to Steve Lipscomb, co- founder of the World Poker Tour, the show is the highest rated broadcast in the Travel Channel's history (Are you ready for some ... poker, 2005). The WPT provides the public with the vocabulary, procedures, and strategic insights of the game by including expert commentary and allowing viewers to see the game's top

professionals in action. Subsequently, WPT viewers have been flocking to online poker rooms and casinos in record numbers around the country.

According to Doug Dalton, the director of the poker room at the Bellagio Casino in Las Vegas, Nevada, the poker room revenues are up 30-35 percent. In the past the poker room was not a major revenue producer. Casinos only offered poker in an attempt to afford a full menu of attractions to their customers. According to Dalton, that has changed. He says that people are now coming to the Bellagio just to play the poker game they watch on television. Moreover, they are captivated by the idea that they can sit at a table and play with one of the world-class tournament champions. Dalton points out that it is not possible for the average person to play golf with Tiger Woods or tennis with Andre Agassi. However, anyone is allowed to sit at a table and play with the world's top professional poker players, if they have the money.

This document addresses the recent interest in playing Hold'em both recreationally and professionally that has accompanied the exposure to the game. It attemps to identify winning strategies that can be used by all players to make their game more profitable. The study also examines problem solving and decision-making principles, taxonomy concepts, and e-Learning to see if the development of an online gaming tutorial is feasible.

The paper does not attempt to answer moral questions, address legal concerns, or speak to a host of other matters that may surface when the term "poker" is mentioned. As is the case with so many contemporary pastimes or recreational activities peoples opinions will be will be subjective at best and downright prejudicial at worst. Hence, these questions should be left to the discretion of the individuals reading this paper or those playing the game.

Background Statement of the Problem

Basic Difficulty.

Poker in general is thriving, and there is no reason to believe that it will not continue to do so (Poker History, 2005). Currently it is played more than any other card game in the world. Huge poker competitions are taking place almost weekly somewhere on the planet. It is estimated that some 100 million people are playing poker worldwide (Poker Corner History, 2005). As previously mentioned, there has been a particularly high interest in playing the game of Texas Hold'em.

There are two main reasons for the exponential growth of Hold'em. First, there has been immense media exposure. Secondly, Hold'em is a very simple game to learn and play (Harroch, 2000). Even a novice can understand the rules and structure of the game in a just a few minutes. What is more, with a few hours practice most people can be playing relatively well (An Introduction To Texas Hold'em Poker, 2002).

Area of Concern.

The ease with which players can learn the rules of Hold'em, combined with its widespread availability, has led to huge numbers of people playing the game. There are approximately 100,000 prime-time poker players on-line each evening (Are you ready for some ... poker, 2005). Many are also playing with regularity in homes, clubs, and casinos (Vorhaus, 2004). Additionally, Hold'em tournaments have grown to levels inconceivable just a few years ago (History of Poker, 2005). What is more, many players are moving directly in to the no-limit version of Hold'em (Vorhaus, 2004).

While it is true that No-Limit Hold'em has always been the game of choice for the world's top players, it has quickly become the variation selected by poker's new recruits as well. The reason for this can be traced to television exposure (Poker Corner

History, 2005). People by the millions are getting their initial look at poker on television, and the game they are watching is the "Cadillac of poker", No-Limit Texas Hold'em. Hence, No-Limit Hold'em is the game they are inspired to play. When playing No-Limit Hold'em a player may bet all the chips in front of him at any time (Vorhaus, 2004). In the past, this was the last version of the game a poker player attempted to master. Most players waited until they were well grounded before playing in the big games. That has changed.

Perceived Need for the Study.

The rules of Texas Hold'em make it an apparently easy game to learn. However, the truth of the matter is that Hold'em is deceivingly simple (Harroch, and Krieger, 2000). Mike Sexton, host of the popular televised WPT, perhaps put it best when he said, "Texas Hold'em takes a minute to learn and a lifetime to master" (Poker Quotes, 2005). The analytical nature of Hold'em requires both strategic prowess and astute people skills (Caro, 1996). The exact manner in which a specific hand is played can be very tricky (Vorhaus, 2004). It can also be a passionately debated topic. To make matters worse, many game theory experts and professional players will legitimize multiple strategies of play. Interestingly enough, their strategy recommendations are often contradictory. To become a Hold'em expert, a player will need to balance numerous strategic concepts and be able to apply them at precisely the correct moment.

With so many people playing Hold'em, the question becomes: are they playing it well? And, if they are not, is there a way for players to improve their game? After all, poker is a game of winning and loosing, and the only way players can keep score is to audit their bankrolls frequently. In No-Limit Hold'em, a single mistake can mean the loss of a players entire chip stack. Moreover, the rookie players can quickly fall victim to

experienced foes adept at detecting weakness, provoking blunders, and aggressively exploiting novice mistakes.

Being a consistent winner at Hold'em is not easy (Good News for Smart Players, 2002). Some estimates suggest that only 10 percent of all poker players are actually winning in the long run. The statistics are just as grim for Hold'em. There are two things Hold'em players must know before taking their seats at the table. First, if they expect to see a profit they must realize that in the long run the cards will break even (Glazer, 2004). This means if a million hands are dealt to ten players, each of them will win approximately 100,000 hands. The second thing they must realize stems from that first truth; in the long run it will be a superior strategy that makes the difference between winning and losing.

With the growing number of people playing Hold'em, the need exists for an instructional system that enables them to develop the skills and abilities needed to compete successfully. Furthermore, players should have the opportunity to learn the game in a non-threatening forum before putting real money at risk in a live casino game or in an online poker room. The good news is that many of the winning concepts, which in the past were known only to a select group of players, are now available to anyone who can read.

There are literally hundreds of articles, dozens of Internet sites, and scores of books on the subject of Texas Hold'em. However, there is no single tutorial or training program that allows a participant to develop her poker skills while actively engaged in a live game. The reason for this is simple; it would just take too long for players to find and read about what to do at any give point during the game.

The enormous interest in playing Hold'em, as well as the complex nature of the game, presents an area of concern. It also presents an opportunity for training and development, which leads to the purpose this study.

Purpose of the Study

Although this study questions no human subjects, it seeks answers to a four questions. The questions are:

1. Can a body of knowledge concerning the game of Texas Hold'em be compiled that exemplifies winning strategies?
2. Can problem-solving and decision-making models be applied to the game of Texas Hold'em?
3. Can Texas Hold'em information and strategy be categorized to form a taxonomy based on the mental processing of complex information at distinct levels?
4. Can the topical information be synthesized to create e-Learning modules that would display multi-level strategic assertions under live Texas Hold'em game conditions?

Information concerning these questions is found in the literature available regarding the following topics: Texas Hold'em, Problem Solving and Decision Making, Taxonomy, and e-Learning. A summary and an analysis of the information found are also included in the final chapter of this paper. Finally, a section including recommendations follows the analysis of the information.

Assumptions of the Study

The primary assumption of this study is that Texas Hold'em is a skill game. This assumption is predicated on the fact that Hold'em has scores of professional players who routinely finish well the world's largest televised tournaments. Two secondary assumptions stem from this primary statement. The first is that these Hold'em professionals have apparently managed to form superior strategies and implement them under game conditions. This ability seemingly provides them with a major advantage over those playing the game haphazardly. Secondly, the knowledge that even the game's top pros were once beginners, suggests that it is possible to develop the skills needed to master the game.

Definition of Terms

The following terms are defined for the purpose of clarification and understanding:

1. Texas Hold'em - The most popular of all the community-card poker games. It is also commonly referred to as Hold'em. It is generally played with between 2 and 10 people. Each player is dealt two cards face down. A round of betting occurs. The top card from the deck is then discarded. Next, three community-cards are dealt face up for all players to use in conjunction with their two hole cards. These community are called the flop. At this point another round of betting occurs. The top card in the deck is again discarded. Then a fourth community card, referred to as the turn card, is dealt face up. Another round of betting occurs. Next, for a second time the top card is discarded. Finally, a fifth community card is dealt face up. This card is called the river card. The fourth and final round of betting occurs. The order of betting is fixed throughout all betting rounds. Prior to

the flop, the third person from the dealer acts first. After the flop the player immediately to the left of the dealer will begin the action. In the end, the player with the best five-card poker hand will be awarded the pot.

2. Decision-Making – To choose a course of action from the available alternatives (Certo, 2003).

3. Taxonomy - The scientific principles of classifying the mental processes of the human mind and the division of intellectual collections or clusters into ordered groups and categories.

4. e-Learning - The delivery of learning content without the presence of a human instructor using computer technologies as the interface between the training content and the learner (The Three Views of e-Learning, 2004).

Limitations of the Study

There are a number of limitations to this study of Texas Hold'em and the subsequent proposal to develop an online tutorial. The first is that no human subjects are being used. Therefore, no hard or anecdotal evidence could be gathered to determine if a tutorial could actually help individuals develop their Hold'em skills.

Moreover, if real players were observed using a Texas Hold'em tutorial it would be impossible to ascertain if a winning or losing streak was the result of tutorial usage or statistical variance. Whether people were playing great poker as a result of the tutorial or not, it would still be possible to win or lose dozens of hands in a row simply do to the theory of large numbers (Gordon and Grotenstien, 2004). A study of literally millions of hands would be needed before any conclusions could be reached about a tutorial's merit. Additionally, multiple players would need to act in exactly the same manner, under the

exact same game conditions, before any wins or losses could be attributed to a tutorial. Of course this would be difficult, if not impossible to control in a live poker environment.

Next, this study has to do with the different variations of Texas Hold'em being offered. The information gathered for this study is not going to be sorted according to betting limits or game type. While the basic rules of the game do not change, there can be enormous differences in the structure and betting limits available. What is more, not all strategies of play will work interchangeably (Basic Texas Hold'em Strategy, 2005). A strategy that works well at a low limit Hold'em table will fail miserably at a no-limit table. Therefore, players will need to decide when fundamental or advanced strategies will be employed based on their goals and game conditions.

Another limitation is that the proposed tutorial would be used while playing on-line Hold'em. While it is generally agreed that playing on-line can improve play and accelerate a player's learning curve, it is also acknowledged that winning poker involves reading and responding to an opponent's recurring mannerisms or actions (Burgess and Baldassarre, 2004). In poker these are called tells. This information becomes a major advantage in live poker games as it allows players to guess the strength of their opponent's hand by identifying their tells (Poker, 2005).

When playing poker online, it is not possible to see an opponent. Therefore, it is not possible to read an opponent in the same way as when playing in a live face-to-face game. As a result, many of the tells evident in these live games will not be addressed in this paper. The topic of detecting tells will be suggested reading for future skill development if players choose to enter a live game.

Lastly, the development of an engaging and effective on-line tutorial can be very time consuming and expensive. There is no budget for the design of such a learning

platform. However, every attempt will be made to suggest ways of providing an interactive learning experience that utilizes the basic principles of good design for web-based training. These suggestions will be found in the recommendation section of this paper.

Methodology

This paper does not include a survey of human subjects. Therefore, the information used for analysis and recommendations is taken from a review of literature related to Texas Hold'em, Problem Solving and Decision-Making, the concept of Taxonomy, and e-Learning principles.

To begin with, the review of literature looks at resources describing the game of Hold'em. After that, a variety of decision-making models are reviewed to determine which ones, if any, can be incorporated into the play of Hold'em. Then information concerning concept of taxonomy as it relates to the mental processes of the human mind is studied. Finally, e-Learning information is compiled to see if a framework can be developed to assist in the transfer of knowledge concerning the skill development and play of Texas Hold'em.

Chapter II: Literature Review

Introduction

This literature review concerns the poker game known as Texas Hold'em, problem solving and decision-making, the concept of taxonomy, and e-Learning principles. Each of these topics in and of themselves constitutes a vast area of study. Therefore, it should be noted that this literature review is not intended to be an exhaustive analysis or explanation of any of them. Rather, the review of the subject matter is intended to determine if a basic understanding of these topics can assist in the fulfillment of the goals and purpose of this study that were outlined earlier. For a greater understanding concerning any of these topics the sources referenced can be of great assistance.

Texas Hold'em

In practice, and throughout this review, the game of Texas Hold'em is often referred to as simply Hold'em. Additionally, the term poker is used synonymously with Hold'em. In this section, the Hold' em's structure, rules, strategic concepts, and the application of strategies are examined. During the application piece of this section, Hold'em fundamentals and advanced concepts are discussed as they might be employed under live game conditions.

Rules of Play for Texas Hold'em.

The rules of play for Texas Hold'em are fairly straightforward. To begin with, it is played with a typical English deck of 52 cards (Texas Hold'em Rules for Play, 2004). The jokers are removed from the deck. Most of the time Hold'em is played with ten players (Warren, 2003). In Hold'em, as in other poker games, players will compare their

five-card poker hand to that of their opponents to determine the winner (Texas Hold'em Rules For Play, 2004). Appendix A show the rank of poker hands.

Flow of the Game.

In Hold'em, the play of a hand can be divided into five main phases. (An Introduction To Texas Hold'em Poker, 2002). They are pre-flop, flop, turn, river, and showdown. Prior to the deal, the two players to the left of the dealer button will place bets, before seeing any cards. This is called posting the blinds. The blind bets are meant to stimulate interest in the pot and entice other players to place wagers when it is their turn to act. The blind bets are used instead of the antes that are required in other forms of poker (Warren, 2003). If the blind bets were not forced, players would likely play the hand only when they were dealt the best hole cards (Playing Out Of the Blinds, 2004). Exactly what constitutes the best hole cards will be addressed later in this review.

After the blinds have been posted, the dealer shuffles the deck and gives everyone two cards face down. This begins the pre-flop stage of the hand. The initial two cards are called hole cards. For now it can be pointed out that there are exactly 1,326 possible two-card combinations a player can be dealt before the flop in Hold'em (Steiner, 1996). However, for all practical purposes the combination of an Ace of Spades (As) and a Jack of Clubs (Jc) is the same as an Ace of Hearts (Ah) and a Jack of Diamonds (Jd), therefore there are really only 169 possible starting hands. Appendix B shows all of the possible starting hand combinations.

Betting Pre-Flop.

After the players have received their hole cards a round of betting occurs (Texas Hold'em Rules For Play, 2004). Prior to the flop, the betting will always start with the person immediately to the left of the blinds and proceed clockwise. Figure 1 shows pre-flop table view with $10.00 and $20.00 blinds already posted just to the left of the dealer (D) button.

Figure 1 - Pre-flop table view (UltimateBet, 2006)

The amount of the bet is determined by the betting limits of the game. A subsequent section on betting limits will explain this concept in detail. At this, and at every other point when a betting decision is made, players must decide if they will remain engaged in the hand. If they fold, all previous bets placed in the pot will be lost. In Hold'em, as in other forms of poker, players may initiate a raise of the blinds, call the big blind, call a previous raise, reraise, or fold their hands. However, in Hold'em, players are not aloud to check, as two of the players have already placed their blind bets in the pot. The decisions to call, bet, raise, or fold will be determined by the strategies being

employed by the players. A number of fundamental concepts and strategies for playing Hold'em will be discussed later in this review.

The Flop.

When the first round of betting concludes, the dealer will discard the top card from the deck and reveals three cards face up on the table. The discard is meant to prevent players from using a marked deck. The exposed cards are called the Flop. These are the community cards that all players use in combination with their two hole cards to make the best possible poker hand. At this point players will be looking at approximately 71% of their hand. The importance of this will be revealed later in this review.

On the flop, another round of betting occurs (An Introduction To Texas Hold'em Poker, 2002). This time the betting decision starts with the player immediately to the left of the dealer, the small blind, and concludes with the tenth player, who has the dealer button. At this point in the hand, players are allowed to check, bet, or raise. Figure 2 shows the flop table view with a betting round in progress. The player to the left of the dealer has checked. The remaining six players will have the option to check or bet.

Figure 2 - The flop table view (UltimateBet, 2006)

The Turn.

When the flop betting round concludes, the dealer removes another card from the top of the deck and places a fourth card face up on the table (Texas Hold'em Rules For Play, 2004). This fourth card is called the turn card or fourth street. Player can now use all four cards, in combination with their hole cards, to make the best possible five-card poker hand. Once again, the player to the left of the dealer button begins the round of betting. In most games, the minimum bet size is doubled on the turn card (An Introduction To Texas Hold'em Poker, 2002). Figure 3 shows the turn card table view. It is the Queen of Diamonds (Qd). The player to the left of the dealer has folded on a previous round, so there are no cards in front of him. The remaining players will have the option to check or bet.

Figure 3 - The turn card table view (UltimateBet, 2006)

The River Card.

Finally, the dealer dispenses one last card and places a final community card face up on the table. This is called the river card (An Introduction To Texas Hold'em Poker, 2002). Players still engaged in the hand can now use any of the five cards on the table in conjunction with their two hole cards to form the best five-card poker hand. At this point, the last round of betting occurs (Texas Hold'em Rules For Play, 2004). As in earlier rounds, the betting starts with the first player to the left of the dealer. (An Introduction To Texas Hold'em Poker, 2002) Figure 4 shows the river card table view with the 8 of clubs exposed. The player immediately to the left of the dealer has already folded, so there are no cards in front of him. The remaining players will have the option to check or bet.

Figure 4 - River card table view (UltimateBet, 2006)

Showdown.

When the final betting round is complete, the remaining players show their cards (Texas Hold'em Rules For Play, 2004). This is called the showdown. All players use their holes cards, and the five community cards to create the best five-card poker hand. In Hold'em, any combination of cards can be used (An Introduction To Texas Hold'em Poker, 2002). In fact, a player may use one, both, or neither of his hole cards to win the hand.

If the five community cards make the best hand, players will not need to use their hole cards. When this happens, players still engaged in playing the hand will split the pot. This is called playing the board. At the conclusion of the hand, the dealer will award the pot to the winner and move the button one player to the left (Texas Hold'em Rules For Play, 2004). Figure 5 shows the showdown table view. All but three players have folded on previous betting rounds. The player with the Ace and Jack of diamonds (AJs) will win this hand.

Figure 5 - Showdown table view (UltimateBet, 2006)

As mentioned earlier, the best five-card combination is used to declare the winning hand in Texas Hold'em. When determining the winning hand however, there will be times when two or more players share the same pair, two pair, three of a kind, and even four of a kind (Split Pots, 2005). When this occurs, the kicker card will be used to determine which hand is the winner. A kicker is the leftover card after a hand is declared. Understanding this reality is very important. It is also important to remember that only five cards are used to determine the winner. The sixth or seventh card will never play a role in determining the winning hand. Therefore, some instances will occur when two or more players will have the same exact hand.

Sometimes the best five cards will be on the board, so there will not be a kicker to break the tie. When this happens, those players will split the pot. To determine a winner in the case of straights, flushes, and straight flushes it will come down to which of the players is holding the highest ranked straight or flush cards. There are only nine different possible five-card straights. In all cases the player holding the highest cards will win the hand. The suits do not matter.

Betting Limits.

Some of the most important aspects of choosing and playing in a Hold'em game are the betting limits associated with that game. When choosing a free or a real-money Hold'em game, players will often have a choice concerning the amounts they would like to wager in each hand played. They do this by choosing the game based on its betting limits. Generally speaking, high-limit games are those involving large bets and low-limit games are those involving small bets. Views regarding limits are often relative to the size of the player's bankrolls. Whether the game is low limit or high limit, the betting limits will fall into one of four categories, fixed limit, spread limit, pot limit, and no limit (Betting Structure, 2002).

The Nature of The Game.

Texas Hold'em has always been the favorite game of the Southern road gamblers (Harroch, 2000). Now it has become the most popular form of poker played anywhere. Aside from the television and Internet exposure, there are numerous other reasons for the popularity of Hold'em. To begin with, Hold'em is an easy game to learn and play (Warren, 2003). In a just a few minutes, the game of Texas Hold'em can be learned by anyone (An Introduction To Texas Hold'em Poker, 2002). What is more, with a few hours of practice most people can be playing relatively well, and have a reasonable chance of winning.

To say that Hold'em is a simple game to learn would be correct (Harroch, 2000). However, it would be a mistake to think that it is an easy game to master. In fact, Hold'em can be very challenging. (Burgess, 2004) The truth of the matter is that Hold'em is deceivingly simple (Harroch, 2000). The analytical nature of the game requires both

strategic prowess and astute people skills (Caro, 1996). Harroch (2000) suggests that Hold' em's blend of strategy and psychology makes it the perfect poker game.

Another reason players like Hold'em is that it is a fast game (Warren, 2003). In fact, it is possible to play twice as many Hold'em hands per hour than in the same hour of playing seven-card stud. Many players also like the strategic advantage that comes with a consistent betting position in the first, and all subsequent betting rounds of a particular Hold'em hand. In stud games the betting starts with the highest hand exposed after each card is dealt. The positional advantage in Hold'em will be explained in greater detail later in the Hold'em Fundamentals section of this review.

The pot size is another popular Hold'em feature. The typical Hold'em pot is much larger than those in other forms of poker. The reason for this is simple; Hold'em is almost always played ten-handed. Additionally, more players will remain engaged in a hand until the showdown. These larger pots will then translate into bigger profits for the winning player. Lastly, finding a game is very easy. Players can find Hold'em games in progress in virtually every casino around the world, it is also very prevalent on-line, and it is usually not difficult to round up a home game or mini tournament (Texas Hold'em Rules For Play, 2004).

Who Wins and Why.

Being a consistent winner at Hold'em is not easy. Some estimates suggest that only 10 percent of all poker players are actually winning in the long run (Good News for Smart Players, 2002). Additionally, the stats are just as grim for Hold'em. To put the percentages in perspective, it is helpful to look at it another way. Of those playing Texas Hold'em, 90 percent of them are losing money. The reasons for this statistic are many. In

this section, a few of the more common Hold'em pitfalls are discussed. By pointing them out, perhaps they can be avoided.

Perhaps the biggest reason people lose money in poker is they overrate their ability to play (Hellmuth, 2003). In 2004, 67 percent of the beginning players, responding to a *Card Player Magazine* survey question, estimated their chance of winning the World Series of Poker Main Event at better than average (Chasing Dreams, 2004). It was clear by their responses, that these poker players had an optimistic outlook, and often an inflated opinion, of their poker abilities. In reality, the Hold'em beginners often start playing the game before they understand the fundamental concepts or advanced tactical maneuvers needed to be a constant winner. They may understand the rules and structure of the game, but they do not really know how to play the game. The best players should avoid becoming over confident or complacent (Hellmuth, 2003). They should continue to read and develop their game at every opportunity.

Next, Hold'em, like other forms of poker, is a game of incomplete information. Therefore players must consistently make the right decision under conditions of uncertainty. There is no way, for example, to be certain of what exactly an opponent is holding. This makes it difficult to make the right decisions time and time again. However, there are some basic concepts that will allow a player to make reasonably well-informed decisions and increase his expectation of winning (How Canadian Computer Programmers Plan to Beat the Game). Indeed, it is possible to make an educated guess as to what an opponent might have. Then players can weigh their chances of success and act accordingly. This skill of reading opponents is an advanced poker concept (Hellmuth, 2003). This will be looked at in detail later in this review.

Next, players must avoid becoming desperate when things aren't going their way. They may have started out with a great hand, but board conditions or heavy betting on the flop, turn, or river cards have made it obvious that they are now beaten. Seeing four community cards that are hearts and not having a heart in hand to match up with them would be an example of bad board conditions (Why There Are So Few Winners, 2005). When this happens players must avoid paying off the likely winner who has made their flush (Gordon, 2004). They should just throw the hand away. The ability to lay down cards that were once powerful, when they have clearly become second best, is the sign of gifted poker players. The art of letting go must be applied to both losing hands and losing session if players are to keep the edge needed to play Hold'em at a high level. Drawing to hands that will not win even if they do hit is another huge mistake made by new players (Texas Hold'em Pot Odds and Implied Odds).

Occasionally, in Hold'em players must fold the best hand (Hellmuth, 2003). Obviously, they will not know they are folding the best hand, however, persuasive evidence at the time indicates that they are behind. If they find out later that they had the winning hand, they must be able to let it go. They should accept the fact that they made a decision and it was wrong. They should take heart however, that they still have chips and they are still at the table. Players must stay focused on winning. They should not look back at an ill-timed fold. Players who are unable to accept poker's misfortunes run the risk of going on tilt.

Tilt is a phenomenon where anger, tiredness, or other distractions can keep players from playing their best game (Vorhaus, 2004). Players must be able to control their emotions in order to get past the inevitable bad beats that will come along. If they do not master this ability, they will dig deep holes that are difficult to climb out of. (Why

There Are So Few Winners, 2005) Gordon, (2004) suggests that one of the best ways players can keep their emotions in check is to make sure they stay sharp, emotionally stable, and focused. He says that players should use the acronym HALT to remind themselves to keep their mind clear. If they are hungry, angry, lonely, or tired, they should not be at the poker table. Even the best players are at a disadvantage if they do not have complete focus.

It would be best not to play at all if she cannot play completely focused. Players need to learn to use inaction as a method of staying on the positive side of the poker ledger. They must always be playing their best game (Caro, 2004). It is not good enough to play their best 50, 75, or even 99 percent of the time. To win they must always play their best game. This will require a high degree of patience. Ultimately, it will be the most disciplined player who will be favored among players with similar skills.

It is also very helpful for players to recognize when they are on cold streaks, so they can avoid it turning into a big losing steak (Gordon, 2004). Cold streaks are a natural occurrence in poker. All great players know that they must take the good and bad hands in stride. It is not impossible to have a cold streak lasting 100 hands or more. Many players fail to account for these trends that statisticians call variance. During these times players will be folding and waiting for the next hand more than they will be playing. (Burgess, 2004) Learning to use inaction during these times will help her avoid big losses (Gordon, 2004).

Additionally, players will need to make sure that they are adequately funded for the betting limits they are playing (Why There Are So Few Winners, 2005). Gordon, (2004) recommends having a bankroll equal to 500 times that of the big blind. Therefore, playing in a $2.00 - $4.00 game would require starting funds in the range of $2000.00.

Unfortunately, many players are taken out of the action as a result of having a few bad hands or a few bad days (Why There Are So Few Winners, 2005). Therefore, Hold'em players need to have an adequate bankroll.

Many players lose because they are too aggressive. While it is true that Hold'em requires aggression, it can be overdone (Gordon, 2004). In some games you'll see players making bad decisions time and again. They will be taking all sorts of unnecessary chances. However, they will be winning pots. When this happens, the solid players are sometimes tempted to become loose aggressive players. This is the wrong strategy. Winning at Hold'em will require objective thinking and long term discipline. Players must resist the urge to play wildly when their opponents are managing to win a few bizarre hands. The reality is that making sound poker decisions will prove correct in the long run. There are a few circumstances when it is correct to play loose (Why There Are So Few Winners, 2005). These instances will be discussed in the Advanced Strategies section of this paper.

Is Winning In Hold'em a Matter of Luck or Skill.

When discussing who wins in poker and why, one debate always surfaces. There is one question that always seems to be asked. Is winning a matter of luck or skill? The simple answer to this question is, yes. It is both (Gordon, 2004). However, the question is really much more complicated. Ultimately, luck plays a very small role in winning in the long run. The reason for this is basic; luck is not bias. After all, everyone gets the same amount of cards and everyone has the same chance of getting lucky (Basic Texas Hold'em Strategy).

The key to winning in poker comes down to the skill of making good decisions (Caro, 1996). In poker decisions really do matter. When playing roulette, craps, or slot

machines, players do make decisions, but they do not really matter. Winning and losing in those games is a total random event. Therefore, an expectation of long-term winning is unrealistic, as it is unlikely that players can overcome the odds against them. The house edge has been calculated in the houses favor and players will not win in the long run (Burgess, 2004). That is precisely why there are no professional roulette players. Players are just wasting their time trying to beat a game, long term, if the odds are against them, and their decisions do not matter (Caro, 1996). Their decisions must make a difference from some logical standpoint.

Gordon (2004) acknowledges that sometimes poker can come down to luck, but asserts that the educated player can take advantage of fortunes ups and downs. Luck is a factor in Texas Hold'em, as in other forms of poker, but perhaps the definition of luck should be examined. A first century Roman scholar perhaps put it best when he said, "Luck is what happens when preparation meets opportunity" (Luck Quotes, 2005).

In actuality, Hold'em is much like business investing (Basic Texas Hold'em Strategy). Gordon (2004) compares getting lucky in poker to the way Warren Buffett appears to get lucky investing in the stock market every year. In reality, wise investors and wise Hold'em players take calculated risks. They increase their chances for success by putting money into ventures that will shown a positive return (Basic Texas Hold'em Strategy). They use data and sound reasoning to calculate their chances. Then they plan their winning investment strategy. In the long run, they get paid to make correct decisions (Caro, 1996).

It would violate the principles of sound investing for financiers to put their money into stocks that routinely lose money. Likewise, it would be illogical to risk capital by investing in stocks that have little or no chance of improving. However, some poker

players consistently invest poorly. They will routinely invest heavily into hands that would require a miracle to win. Then they will continue to devote more money after seeing a flop, turn, and River, none of which has helped them improve their hand. They are either ignoring the reality that another player has a better hand, or they are oblivious to the fact. They continue this style of play again and again, allowing smart investors to take their money the majority of time (Basic Texas Hold'em Strategy). More will be discussed concerning these winning concepts and positive expectation in later sections.

One of the great things about poker, however, is that bad investors will occasionally see miracles happen. With the odds stacked against them, and in spite of their bad play, these players will win a pot or two (Basic Texas Hold'em Strategy). It will not please the good players, when someone hits a 22 to 1 long shot to win, but over the long haul they should be pleased to know that they will be pocketing that money the other 21 times (Gordon, 2004). Additionally, once these opponents win a few pots playing badly, they will not stop playing badly. In psychology this is a form of conditioning referred to as random reinforcement. When these bad players occasionally get lucky, they will continue to pay off the skilled player (Basic Texas Hold'em Strategy).

Hold'em Practice.

The best way to learn the game is to play (Gordon, 2004). However, it can be difficult to learn in casino poker rooms without losing to more experienced players. Fortunately, new players can practice for free in an on-line poker room or while playing against a computer simulator. Some simulators allow users to customize the individual playing styles of each virtual opponent.

Keeping Records.

When keeping records of each session, players should record the date of the game, where the game was played, the betting limits, the hours that were played, the amount that was won or lost, the hourly rate of wins or losses, and a running total of all session (Warrens, 2003).

Texas Hold'em Strategies and Concepts.

The Hold'em fundamentals are those basic poker investment concepts, elementary skills, and primary strategies that all players will need in order to be successful. Players should thoroughly grasp these Hold'em fundamentals before ever accepting cards at the table (Caro, 1996). Some of these concepts are so vital, that they almost belong in the same category as rules of play. They are not rules, however, and individual players must choose to adhere to these basics. Players will decide, when, and how often they want to violate the fundamental principles of winning Hold'em. Moreover, as their skill level progresses, it may actually be correct to do so. When those instances arise, they will be making decision based on more advanced principles and playing strategies.

Just as there are fundamental concepts, there are also advanced strategies in and plays that can be made in Hold'em. These advanced plays should be employed under very select circumstances. They will not work all the time. Moreover, not all strategies

will work interchangeably (Basic Texas Hold'em Strategy). Some strategies work better in high limit games, while others will be more effective in a low limit game. In other cases, strategy adjustments will be necessary to account for game conditions and the playing style of opponents (Hellmuth, 2003). The advanced plays take the game a step further by examining and accounting for the subtleties of the Hold'em. Ultimately, playing advanced Hold'em will require players to dedicate higher degrees of concentration in order to effectively apply the correct strategy under game conditions. This ability is beyond the skill level of most players.

The only way to reach this level is to play the game. Ultimately, players will need evolve to this plane if they intent to move up in betting limits, as they will undoubtedly find more talented opponents (Basic Texas Hold'em Strategy). The strategic concepts discussed in the next sections are divided into two major categories, Hold'em fundamentals and advanced strategies.

Texas Hold'em Fundamentals.

In this section, the fundamentals of Hold'em strategy will be addressed. These are the concepts that a Hold'em player will need to understand before taking his seat at the table. This is not the same as discussing the rules of play. Here the basic strategic concepts for playing are outlined as well as many of the concepts a player will encounter at virtually every Hold'em table. The order in which the strategic topics are mentioned should be noted as they will build on each other and culminate with a decision to play or not to play various hands. The play or not to play decision will often be followed by a how to play recommendation.

Before Sitting Down To Play.

At the most fundamental level Hold'em players must understand what to expect when they enter a game, they must know how to make game, table, and seat selections. Then they must know what criterion constitutes good starting cards. They must be able to choose a good starting hand and determine if their cards remain valuable after the flop. Additionally, they will need to know how to play their hand both before and after seeing the first community cards flop. The segment on hand selection will describe the quality card concept in detail.

A Game of Aggression and Deception.

There are two poker concepts so intertwined, and such a big part of Hold'em, that they will be discussed together. They are aggression and deception, and a player will see them both to varying degrees at virtually every Hold'em table (Gordon, 2004). These attributes of the game will be evident at various junctures throughout the game. At this point, a word of caution is justifiable. To suggest that players will witness these forms of aggression and deception is not the same as saying that they should employ the tactics. This is particularly true for Hold'em beginners. Many of these concepts are advanced strategies and should be used only when experience and game conditions justify.

During the game players will be required to follow protocol (Warrens, 2003). Throughout the play of every hand they will need to act in a prescribed manner. The players to the left of the dealer button will go first, then subsequent players, ending with the dealer button. When the players act they will either check, bet, call, raise, or fold. Each of these acts, with the exception of folding, is either an act of aggression, deception, or a combination of the two. Folding is an act of passivity, which is on the opposite end of aggression (Burgess, 2004). The acts of aggression and deception will fall into one of

three categories. They are warranted aggression, deceptive aggression, and passive aggression.

Regardless of the type, aggression is an important part of Hold'em and players will be wise to practice it and note when it is occurring (Gordon, 2004). Sometimes a strong hand warrants an act of aggression. On a fundamental level, players will need to use this warranted aggression to win pots. Player will also need to learn to flee from warranted aggression when they do not have the cards to compete. Warranted aggression will normally come in the form of a raise or reraise. Players use these acts of aggression when thee believe they currently have the best hand. Their raise informs the other players of this belief. In some instances, other players will heed the warning and fold. In other cases, they will call the bet. By calling the bet opponents are stating their own confidence and willingness to invest in their hand. There are numerous reasons to bet, check, or fold. The reasons to act one-way or the other be determined by the momentary situation (Flop Strategy, 2004). These various situations and circumstances will be pointed out later in this review.

Gordon (2004) asserts that the ability to play aggressively is the one factor that seems to connect all great Hold'em players. He says that aggression appears to have an almost mystical effect at the poker table. These strong raises will often force opponents to react. It compels them to make the tough decisions. Players generally do not like making these tough decisions. However, by taking control of the betting players can cause their opponents to speculate, perhaps even agonizes, about the merits of their hand. When everything goes perfectly, these opponents will lay down better hands than the aggressor is holding. This is associated with an advance concept called bluffing. Bluffing will be discussed later in this review.

Players also use aggression to gain information. It lets them know where they stand. Players who call a raise are often on a draw, or have a made hand, but lack confidence in its strength. When opponents reraise or check-raise it should be acknowledged as a sign of strength. This usually implies a very powerful hand or an excellent draw. Granted, making a raise may not be the most cost efficient way of acquiring information from opponents, it is usually the most effective (Hellmuth, 2003).

Aggression early in the hand may also allow players to see free cards later in the hand (Steiner, 1996). This aggression on the part of players can turn second-best hands into good drawing hands. Sometimes aggressive betting will create the correct pot odds for them as well. A well-timed raise before the flop or on the flop will often discourage opponents from betting or raising with hands of moderate strength. When this happens, the players making the original raise can often see card later in the hand for free. This is wonderful, as cards on the later betting rounds are more costly. Raising also prevents them from giving free cards away. It is generally considered an error of the worst kind to allow an opponent to see a free card, as it will often help her make a better hand.

When players raise before the flop, they should try to disguise their true strength (Gordon, 2004). There are two ways to accomplish this. First, they can randomize the size of their raises. Secondly, they can raise the same amount every time. By doing either, they do not risk giving away information about their hand strength. Normally a table will settle into a standard raise. That amount is often between 2.5 and 3.5 times the size of the big blind. There is nothing wrong with adhering to this practice.

Deceptive aggression and passive aggression are the other two forms of hostility Hold'em players will witness at the table. Deceptive aggression is an unwarranted display of strength, more commonly referred to as a bluff. A bluff occurs when players bets

without belief in their hand. By betting they are attempting to convince their opponents to fold, so they can take the pot without further contest. At times players will semi-bluff at the pot. A semi-bluff is similar to a bluff; however the perpetrators have more than one way to win the pot. First, their opponents might fold without dispute. Second, players making a semi-bluff might improve to their hands and win the pot in a showdown. Lastly, a scare card may appear on the board that causes their opponents to fold in the face of a bet.

Passive aggression is perhaps the most advanced level of aggression players will witness during the game. There are several Hold'em plays that belong in this category. Check-raises, slow plays, smooth calling, and setting traps are all forms of passive aggression. Players will employ these strategies very selectively. In essence, these passive aggressive plays are use in two different ways. Sometimes they are meant to hide the true strength of a hand in an attempt to keep other players engaged when they may have otherwise folded (Flop Strategy, 2004). Additionally, sometimes opponents will be persuaded to bluff at the pot, or worse yet, they may be lulled into a false sense of confidence their own hand. In other instances these passive aggressive plays are used to mislead an opponent. They become warnings to observant opponents. These warnings may cause them to release winning hands in the future.

Understanding Opponents and General Playing Styles.

Hold'em is a game that requires both strategic and people skills (Caro, 1996). To do well in Hold'em, players must attempt to understand their opponents. Understanding players and game types will help players make better investment decisions. Being able to categorize opponents and games will allow players to win in the long run (Basic Texas Hold'em Strategy). Hold'em players must be able to assign meaning to the way their

opponents are playing (Hellmuth, 2003). Poker games, and the people who play in them, are generally described with two sets of opposing adjectives (Gordon, 2004). Players and games are said to be either loose or tight and either weak or strong.

Without going into great detail, it is important to know that there are several playing styles used in Hold'em. These playing styles translate into what can be called player types. This is similar to what might be referred to as their investment strategy. Players are said to be tight if they investments are very conservative. These individuals will only play cards that have a positive earning expectation. On the other hand, some players relax their starting hand requirements in an attempt to play a greater volume of hands. These players are said to be loose. As is the case with most possibility spectrums, there are extremes.

These extremes for Hold'em would be referred to as either super-loose or super-tight (Hellmuth, 2004). Players will decide how loose or tight they will play. Their level of laxity and willingness to show aggression will determine which cards they choose, how aggressive the bet, and from what position they will act forcefully. More about positions and how they affect the game will follow in this review. For now, the general player types will be defined and what characteristics these players might exhibit.

The first type of player seen at the Hold'em table is referred to as a loose. Loose players are fairly common (Hellmuth, 2003). These players will take more chances than normal by playing speculative hands. These players are called fish or calling stations (Basic Texas Hold'em Strategy). This is the worst type of player and the very prevalent in Hold'em. The calling stations have poor hand selection, they will call bets with just about anything, and they will continue to play poorly all the way to the river. These opponents have very little skill or discipline.

The second player type is called super-loose. Super-loose players will be very aggressive. Moreover, these players want to play virtually every hand from every position (Hellmuth, 2003). Unlike the fish, these players are more aggressive (Basic Texas Hold'em Strategy). They are inclined to raise and reraise often. They are also capable of making calls, betting, raising, and reraising with nothing. They show very little restraint during the play of drawing hands, but they will lay down the cards when they are clearly beaten. When two or more of these player types are in a game the pots can be very large. Therefore, it is possible to win or lose large amounts of money when playing with these individuals.

The next player type is relatively rare. They are referred to as a situational expert (Hellmuth, 2003). A situational expert will play in the moment. They will consider game conditions, their opponent's style of play, position, pot odds, and the earning potential of their cards before making any decisions. These players are both tight and aggressive. They have the ability to adapt to different players and game conditions. They will not play many hands. When, they do play, their confidence and ability to take control will be apparent (Basic Texas Hold'em Strategy). They are also capable of folding hands when other players might be trapped. The tight aggressive players are fierce opponents. They are at the top of the poker echelon.

There is another player type called weak-tight (Basic Texas Hold'em Strategy). Weak tight players will choose starting hands more cautiously and play them guardedly. They have most of the skills that wining players possess. Their main limitation is related to fear. They will often be playing scared. Therefore, they will be convinced to fold more often than they should. Bluffing is not a big part of their game.

Super-tight players are the last player type. Sometimes these players are called rocks (Basic Texas Hold'em Strategy). Rocks will not be engaged in many hands. They will throw all but the best hands into the muck before the flop. After the flop, they will fold in the face of even slight danger signs. They will be reluctant to risk hips when it would be right to do so (Hellmuth, 2003). There main limitation is predictability (Basic Texas Hold'em Strategy). Other players will know when the rocks have a good hand and will avoid pay them off.

Investment laxity is a very important concept and will play a vital role in learning the game of Hold'em. Hellmuth, (2003) states that beginning players should play super-tight before the flop. He goes on to clarify this position by telling beginners to restrict themselves to playing only the top 10 hands and pairs while learning the game. In time he recommends that new players expand their starting hand selections to include the thirteen possible pairs, ace king, and ace queen.

Game Conditions.

Normally there will be four or five players involved in the hand before the flop (Basic Texas Hold'em Strategy). If more players typically engage, especially if there have been raises, then the game is considered to be loose. In contrast, if the number of pre-flop players is less than three then the game is said to be a tight game. In very tight games one player will raise and another will contest to the end.

Game Selection.

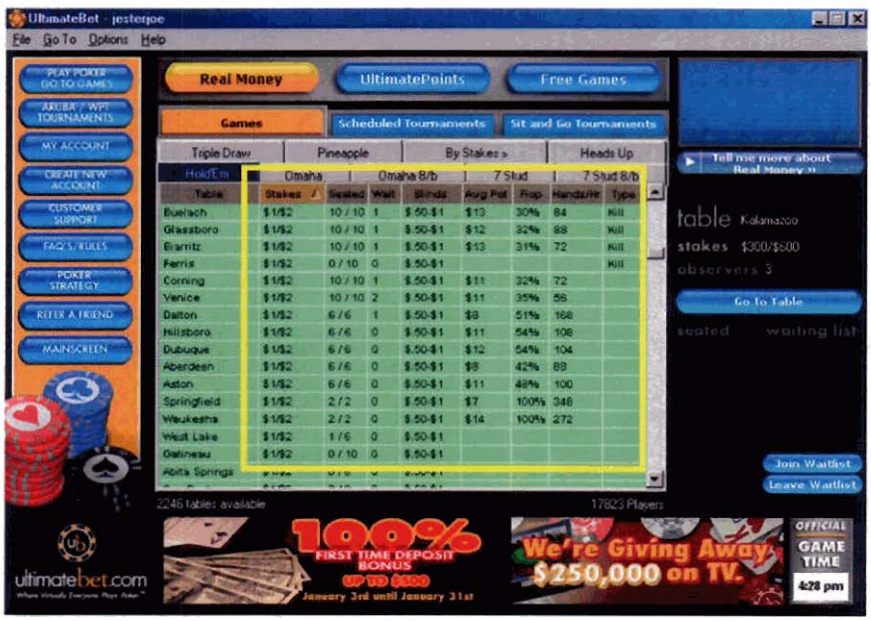
There are a number of things to consider before joining any Hold'em game. One of the most important considerations for choosing a table will be the betting limits (Why There Are So Few Winners, 2005). Betting limits will determine the wagers that are

allowed. Generally speaking, players should choose games with betting limits that will not overwhelm their bankroll. Gordon (2004) suggests that players have a bankroll equal to 200 or even 500 times the amount of the big blind. With that in mind, players would need a bankroll of $800 to $2,000 before playing in a $2 - $4 Hold'em game.

Table Stats.

It is also possible for players to choose games based of various statistics. For example, a player may want to choose a game on the basis of the number of hands played per hour, number of players in the game, number of those who see the flop, or the average pot size. These stats may help him determine if the pace and temperament of the game suits his bankroll, playing style, and skill level. A player may need to watch a live casino game for a while to ascertain the desired information. However, when selecting an online game, all the information needed is displayed on the Game Selection Screen. Figure 6 shows the game selection screen. Here a player may choose the type of game, real money, ultimate points, or free games, as well as the game, betting limits, etc.

Figure 6 - Game selection screen (UltimateBet, 2006)



Playing Shorthanded.

Most of the time there will be ten players in the game (Warren, 2003). However, it is possible to choose a table with fewer seats. There will also be times in a cash game or in the final stage of a tournament when a player will be facing fewer than nine opponents. There are several important differences to be mindful of when playing with fewer opponents. These peculiarities will require players to make some adjustments to their game.

In a shorthanded game, players will be forced to play more hands, as they will be required to post blinds more frequently than normal (Gordon, 2004). Drawing hands will become less valuable as they will not normally produce the correct pot odds. On the other hand, high cards and pocket pairs will increase in power. There may be more pre-flop raising with hands that would not be normally played in a full game. This increased action and combined with the extra hands being played will intensify any bankroll swings. In other words, players will win and lose larger amounts of money more quickly in shorthanded games. This may be a good reason to avoid them.

Choosing a Seat.

Seat choice may also affect the chance of winning. In Hold'em, as in other forms of poker, the money at the table will tend to move clockwise (Caro, 1996). Therefore, if given the choice, new players should sit to the left of the players with the large chip stacks. The clockwise chip movement is particularly evident in Hold'em due to the use of position as a betting tool. More on the use of position will follow in this review. If it is not initially possible to get the preferred seat, be patient as it may open up later in the

game (Gordon, 2004). If a seat does open during the course of the game any player has the right to move to it. All he needs to do is inform the dealer of his wish to move.

Hold'em Math.

Many new players are intimidated by the notion of having to use complex math skills at the Hold'em table (Burgess, 2004). However, the math proficiencies needed in Hold'em are actually quite fundamental. Most players should be able to grasp them and use with confidence. It will not be necessary to make exact computations while in the midst of a hand. In fact, many of the top pros would have difficulty calculating the exact odds of ever hand while in the heat of battle. With that said, the ability to apply these mathematical concepts and generalities will mean the difference between winning and losing in the long run.

The first math concept is that of mathematical expectation. The idea was briefly mentioned earlier during the discussion of wise investing. Remember that wise investors only take calculated risks (Gordon, 2004). They succeed by putting money into ventures that have a good potential for return. In Hold'em there are only five possible decisions a player can make while playing a hand. They may check, fold, call, bet, or raise (Basic Texas Hold'em Strategy). That is it. Consequently, something must guide this decision-making. Mathematical expectation is the first guiding principle for Hold'em players (Burgess, 2004).

In every situation encountered the choice that makes the most money, or loses the least amount, over the long run is the choice that should be made. To be more specific, when a check, fold, call, bet, or raise loses money, it is said to have a negative expectation. When it wins money it has a positive expectation. In every case, Hold'em

players must try choosing the action that will maximize their positive expectation or minimize their negative expectation. That is the essence of mathematical expectation.

Pot Odds.

There are a number of simple ways that players can make sure they are getting a good return on their investments. The first is to learn how to calculate pot odds. Pot odds help players examine the risk/reward ratio (Cardoza, 1988). The ability to calculate pot odds will make the tough decisions a whole lot easier. For example, if the pot holds $100 and the bet to be call is $20, then the pot odds are $100.00 to 20.00 or a ration of 5 to 1. Using pot odds will help players determine if the cost of chasing the pot is justified (Texas Hold'em Pot Odds and Implied Odds). This skill is particularly useful to players when they need to know if is it right to play marginal hands before the flop, or pursue drawing hands after the flop.

Of course, it will be very difficult to know the exact chance of winning the hand before the flop. However, it is possible to calculate the odds that the pot is laying before the flop. To determine if it is correct to call a bet after the flop based on the pot odds, players will need determine how many of the remaining cards in the deck will help them win the hand. Additionally, to be fiscally correct, players must also be reasonably sure the hand they are pursuing will be the best if it does hit. Drawing to hands that will not win even if they do hit is one of the biggest mistakes made by new players.

It is not necessary to be able to calculate the exact pot odds. All a players needs to do is make an approximation of the odds for the concept to be beneficial. The quickest quick way of figuring the odds is called the 2/4 rule (The 2/4 Rule For Calculating Odds, 2005). The 2/4 rule will get a player very close the actual figure. Normally it will be within a percent or two. To use the 2/4 rule, players must first count their outs. In

Hold'em, outs are the numbers of cards that will help complete a hand. For example, if the flop brings two suited cards that match a player's hole cards, they will have nine outs to make their flush. This is certain, as there are exactly 13 cards of each suite in a standard 52-card deck.

To get the percentage of times a hand will win if it improves, players will multiply the number of outs by either two or four. If they intend to see one card players will multiply the outs by two. If they are committed to seeing two cards, they will multiply by four. In either case, the number arrived at will be the approximate percentage that a draw will hit.

Players holding four cards to a flush have a 36 percent chance of hitting it on either the turn or river. The flush will occur just over 1/3 of the time. The odds are 2 to 1 against making this hand. Therefore, players will be getting the correct pot odds only if pot size is more than two times the bet needed to call. This skill to calculate pot odds quickly will be helpful when players are forced to make a decision based on pot odds. This situation will arise frequently, especially in multi-way pots. The application of this concept is covered in detail later in this review. Specifically the relevance is shown while discussing drawing hands after the flop in the application section.

Implied Odds.

Another important Hold'em concept is that of estimating implied odds. These are the odds players will be getting if they could accurately assume the betting results for an entire hand (Texas Hold'em Terms, 2005). With pot odds, players are using the amount of money currently in the pot to make important investment decisions. However, when using implied odds, they will estimate how much is in the pot now, plus the amount that can be won later if they make their hand (Texas Hold'em Pot Odds and Implied Odds,

2005). Learning to calculate the implied odds is very important. However, it is not an exact science, nor does it need to be. The ability to get a general idea will be more than adequate.

The implied odds can be estimated before or after the community cards are exposed. However, the pre-flop implied odds are more difficult to assume with certainty. It is, however, possible to estimate them based on the nature of the game, opponent types involved, and previous betting patterns. Estimating the implied odds is also much easier if done from a late position at the table (Steiner, 1996). Player in a late seat will be able to see which players have already called bets or raised the pot before the flop. Once again, online players can check the game stats page to see how big the average pots are.

No-limit Texas Hold'em incorporates the expected value of implied odds perhaps more than any of the other betting limits (Gordon, 2004). However, the stakes are much higher. Gordon (2004) compares it to Russian roulette. He states that being a 5 to 1 favorite to win is great; however, the punishment for losing is extreme. In a limit games, players know the exact number of bets possible per round. In a no-limit game players may risk all their chips at any time. Implied odds therefore, are important when choosing to play certain hands. It has particular relevance when hoping for trips and flushes to hit the board (Poker Strategy, 2004). This concept will be detailed in a later review section that discusses the play of various drawing hands.

Pot Size.

There are two things to remember regarding pot size. The first is this: it is possible to control the pot size with betting (Gordon, 2004). This concept can work for or against players. By making frequent bets or raises, players may be able to convince their opponents to check rather than betting. This approach may allow players to see free cards

later in the round. These complimentary cards can add up to a lot of money saved in the long run. Unfortunately, a bet from an early position, that gets several callers, can also create the correct pot odds for players with weaker hands. This situation may not be good, as some hands play better against fewer foes (Caro, 1996).

The second important pot size concept is that winning the most pots does not guarantee the highest profit (Burgess, 2004). In all forms of Hold'em, but particularly in no-limit, it is important to remember that winning players do not always win the most pots. The reason for this is that pots very in size. Therefore, it is generally better to win big pots, and lose small pots (Gordon, 2004).

Playing Position.

Playing position is the most significant consideration before the flop of any community cards (Burgess, 2004). In fact, where players are seated at the table will determine when they and how they play. The concept of playing position is so important; it should be considered before engaging in any hand (Warren, 2003). Players will also consider their position before the flop, after the flop, on the turn, and at the river (Basic Texas Hold'em Strategy, 2005). When Hold'em players discuss playing position, they are normally referring to where they sit with respect to the dealer button. However, they may also be applying the term to their sit with respect to a particular player types (Glazer, 2004). The ability to read and classifying opponents is an advanced skill that will discussed later in this review. For now, the focus will remain on position with respect to the dealer button.

There are ten seats at the typical Hold'em table (Warren, 2003). At the beginning of the game players will receive one card. The player with the highest card wins the right to be the dealer. A dealer button will be placed in front of that player. That dealer button

will rotate clockwise at the end of every hand (Texas Hold'em Rules For Play, 2004). Where players are seated in relation to that button is said to be their position. In Hold'em there are four basic categories of position. They are the blinds, early position, middle position, and late position (Basic Texas Hold'em Strategy, 2005). The early positions are the blinds and the two players to the left of the big blind. The middle positions are generally considered to be the next three players. The last three to act are said to be in late position. (Burgess, 2004)

Position is important as it determines the acting order of the players (Basic Texas Hold'em Strategy, 2005). Most of the time players will be facing more than one opponent (Gordon, 2004). Having a later position allows players to observe the actions of their opponents before having to make up their mind (Basic Texas Hold'em Strategy, 2005) In a game of incomplete information, the added information gained from watching others act can be very valuable (How Canadian Computer Programmers Plan to Beat the Game, 1997).

Small and Big Blind Positions.

When players are in one of the blind positions, they will be among the last to act on the first round of betting (Gordon, 2004). However, they will be forced to act first in all subsequent rounds. Therefore, these may be the most problematic positions to play well in Texas Hold'em. On the first betting round, they will already have money in the pot; therefore, they will be more inclined to play the hand at least until after seeing the flop. This is particularly true if the pot has not been raised. Players in the big blind would have no reason to fold if there has been no raise. If there has been a raise, then the players in the blinds are likely to fold if they hold inferior cards. This will be true unless there

have been a many callers in front of them. In such cases the pot odds would make it correct for the early positions to make the call regardless of their hole cards.

When in the blinds, players will also be required to call bets and raises in order to defend their blinds (Basic Texas Hold'em Strategy, 2005). They do this to deter the players in the late positions from trying to steal the blind bets without contest. This concept is moving toward advanced play, but it is worth knowing about. Even beginning players may be forced to play inferior hands in an attempt to deter repeated late position raises (Beating Tougher Games, 2005).

Defending the blinds may be the first adjustment made by beginners when they are trying to beat tougher games. They will need to pick their spots to defend against aggression, as it can be very costly call with mediocre hole cards. Additionally, players will need to counter the games aggression by raising more hands when they are in late position. This action will force opponents play their marginal hands out of position.

Playing Early Positions.

The two or three players seated directly to the left of the blinds are said to be in early positions (Gordon, 2004). Playing Hold'em from these early positions can be very difficult. When players are seated in one of these early seats they must play very solid poker (Beating Tougher Games, 2005). There will be as many as six or seven players acting behind them. Any of those players could have quality hands that justify a raise (Gordon, 2004). Additionally, those players in middle and late positions will also have the benefit of watching others act before it is their turn.

Players acting first are in the weakest position (Cardoza, 1988). They will have the least amount of information about how the opposing players are going to act on their hands. Others may raise the pot beyond what they can justify given the cards they hold.

Therefore, the early positions must play a more conservative and cautious game. These players should be playing very few hands before the flop (Gordon, 2004). They should limit their play to those cards that have a positive expectation of winning (Warren, 2003). They should certainly not call bets with marginal hands. This is true because too often there will be raises coming from players behind them (Cardoza, 1988). By throwing away the poor to marginal hands a player will be saving money in the long run (Harroch, 2000). Again a definition of starting hands and closer look at how they are classified will be discussed later in this review.

Middle Positions.

Playing from a middle seat is less treacherous, but still requires pre flop restraint (Gordon, 2004). Middle position players will have more information when it is their turn to act. Furthermore, after the flop, they will not have to make any decision until the blinds and the early position players have acted. This extra information allows a player in the middle to play a relatively wider selection of hands. If none of the other players have entered the pot, they may consider putting in a raise with a hand that would have been thrown away from an early position. On the other hand, if an early position has already raised, they can safely fold some of the marginal holdings.

Normally the pot odds will make it correct to call the blinds if no one has raised. However, this may unwittingly create the correct pot odds for other players to call (Warren, 2003). Attempts to steal the blinds also works best when made from the middle positions (Gordon, 2004). Players will often expect an opponent in a late position or on the dealer button to try stealing the blinds, but a raise from a middle position tends to get more respect.

Late Positions.

The player seated on the dealer button is in the best position, because they will act last during every round of betting from the flop on (Gordon, 2004). Those two players to the immediate right of the dealer button will also be considered in late positions (Basic Texas Hold'em Strategy, 2005). Being among the last to act in a hand can be a great advantage. Often players in late position will sit back and watch everyone else in front of them to act (Basic Texas Hold'em Strategy, 2005). This information is important and players seated will be wise not to ignore it (Texas Hold'em Position, 2005).

If players in late seats observe a great deal of action they should fold weaker pre-flop hands. However, if everyone has checked, late position players might try to bluff at the pot (Gordon, 2004). These acts of aggression can have an unnerving affect on the blinds and they will fold their hands. Beginning player should rarely bluff. Bluffing is an advanced concept that will be discussed later in this review.

Playing from one of the last positions will allow players more leverage and flexibility. Players in late positions may also play weaker cards if the money in the pot justifies it. As was the case with the blinds, they will only need to win a small percentage of the time to make a profit (Basic Texas Hold'em Strategy, 2005). Even poor holdings may be better than what the blinds have. Gordon (2004) says that some players refer to the late position seats at the table as the office, as this is where they get the work of winning poker accomplished.

Progressive Positional Play.

Advanced Hold'em requires players to place more emphasis on position and the use of aggression (Beating Tougher Games, 2005). In tougher games, playing position involves two concepts. The first is where a player is sitting with respect to the dealer

button. That concept was discussed above. The second is where a player is sitting with respect to particular players.

In general, players want loose aggressive gamblers and calling stations to their right (Glazer, 2004). This provides a positional advantage. Players can give up their positional advantage to weak and tight players, because they will not take full advantage of their position anyway. Ideally it would be great to get position on everyone. However, this is not physically possible. Some players have to be on the right and others will have to be on the left.

Playing Pre Flop.

Hold'em players will make two key decisions during every hand of play (Steiner, 1996). First, they must decide if they will pay to see the flop. Secondly, they will decide whether or not to continue after seeing the fit between their hand and the community cards exposed on the flop. The good news for the Hold'em players is that making the pre-flop hand decision is the easiest part of the game to learn (Burgess, 2004). To make this determination they will factor their position, the odds currently available, their level of investment laxity, and their two hole cards (Steiner, 1996). A brief analysis of laxity, odds, and position has already been submitted, so at this point the pre-flop decision regarding hole cards will be considered.

Hand Groupings and Classifications.

After players take their seats at the table they will be dealt two cards (Texas Hold'em Rules For Play, 2004). Players are then forced to make the first of their two critical decisions (Warrens, 2003). That first vital decision in Hold'em, as in other poker games, is which hands should be played and which should be thrown away. As stated earlier, players will use their position and an approximation of the odds to assist with

their decision. However, there are other factors determining when and how to play a starting pre-flop hand as well. Players need to know why certain hands are valuable and why others are not. The following section contains a breakdown of which cards should be played and why.

In Hold'em, the cards become an important part of the game when players are contemplating whether or not to get involved with a hand (Glazer, 2004). Players do not, and should not, play every hand (Burgess, 2004). In order to make an informed decision, players will need to decide which cards constitute a quality starting hand worthy of an investment and which cards should be automatically be folded (Caro, 1996). The answer to this question can be complicated and debatable.

Good Investing.

To begin with, players must understand that it is not possible to play ever hand and be a winning Hold'em player (Burgess, 2004). Nor can the decision to play be based on a gut feeling or how well a particular hand preformed in the past. A much more discerning strategy is necessary (Basic Texas Hold'em Strategy). The quickest way for players to lose money in Hold'em is to take part in too many hands before the Flop (Burgess, 2004). Success in a Hold'em requires players to be disciplined and highly selective about the hands they decide to play (Caro, 1996). Quality counts in Hold'em. Players must play fewer, and better hands, than their opponents (Basic Texas Hold'em Strategy, 2005) When Hold'em players do decide to invest in the cards, they will be trying to play only those that have a positive earning expectation. That is they will play cards that have a better than average chance of winning. Like an investor, Hold'em players want to put their money into hands that will pay dividends.

While it is officially true that any two cards can win in Hold'em, a more meaningful truth is that some combinations of cards win more than others (Caro, 1996). Poker is a game of expected value. Winning money is accomplished by betting in situations where the expected value is positive. It is also possible for players to hold on to their cash by not betting when the expected value is negative. The first secret to winning Hold'em, therefore, is learning which hands have positive expected value. Knowing your chances and planning your strategy can help you win. This is a skill called hand selection.

Using the investment analogy, hand selection is similar to investors knowing that a particular stock was likely to outperform the others in their portfolio (Gordon, 2004). In these cases the investors would devote more of their money in those shares. The same is true in Hold'em. There are starting hands that win more than others. They do not always win, but they do win more often than many other holdings. When these hands appear, good players take advantage of the investment opportunity and get more money into the pot.

The opposite is true among weak players. Too often their tendency is to play poor hands just to see the flop. They reason that it will be worth it to see three cards at one time on the flop. Moreover, they speculate that the flop might help them form a great hand. Unfortunately, hoping for miracles on the flop is a sure way to lose a lot of money in Hold'em (Silberstang, 1996).

To maintain the rigor required in Hold'em, players need to determine how much assistance will be needed from the flop in order to be confident about their hand (Caro, 1996). Given the uncertainty of the flop players must mentally arrange the circumstance where their hand wins (Burgess, 2004). If that mental arrangement is a long shot, they should fold. Many players lose discipline after throwing away an 8 and a 5 when they see

the flop come 885 (Caro, 1996). This type of crazy flop will often prompt players to start believing in the seductive reasoning that any two cards can win. The key to winning in Hold'em is to overcome this temptation. In Hold'em, decisions matter and it is important to make good ones. It is not enough to occasionally make good decisions. Winning players repeatedly make correct decisions.

With that background, it can be understood that hole card quality does matter in Hold'em. Fortunately, Hold' em's takeover as the leading poker game in the world has resulted in an array of written analysis on the starting cards (Steiner, 1996). Virtually every Hold'em book, article, and web site includes a section entitled "Hand Selection", or "Hand Groupings". These documents refer to the ranking of the hole cards. Unfortunately, there is a great deal of debate surrounding the subject of placing a value on those cards (Gordon, 2004). This debate can be confusing for new players (Steiner, 1996).

Starting Hand Value.

After players consider their position and the odds, the true hand value is determined by three basic factors. First, how much, if at all, will the hand need to improve to be the winner? Secondly, how soon will the improvement be evident (Gordon, 2004)? Third, will the hand fair better against one or many opponents (Steiner, 1996)? There are basically two ways to assign quality to the starting hole cards. The first is to rank each of the169 possible combinations from best to worst based on their earning expectation. The second is to apply various traits to the cards that may prove beneficial as the hand plays out.

Starting Hand Types.

Before looking at individual hand ranks or groupings, it can be beneficial to look at some overall hand types and characteristics. By doing this, it should be evident why certain hands have been ranked above others. There are different names given to the classifications; however, the intent is the same, to place a value on the hole card combinations based on their expected earning value.

Steiner (1996) says the first element in defining good starting holdings is identifying which ones will mesh well with the community cards. These community cards are also referred to as the board. Starting hands that will match with assorted board combinations have more value. A second important element is how soon the fit between the starting cards and the board will be apparent. If a call or fold decision will be clear after the flop, it may be worth the investment. However, if the decision is unlikely to be clarified until the turn, it may be too expensive to pursue the hand.

All starting Hold'em hands will have certain characteristics. These traits will be evident just by looking at how the two cards go together. Caro (1996) divides the starting Hold'em hands into six categories: pairs, suited cards, connected cards, suited and connected cards, high cards, and rags. Burgess (2004) refers to three different types of hands. They are made hands, drawing hands and trash hands. Made hands need little or no improvement to win. Made hands are high quality to begin with. These are the powerhouse hands that are most likely leading pre-flop (Caro, 1996). With a made hand players want to be facing only one or two opponents (Burgess, 2004). A pre-flop raise will normally help to limit the field of players.

Another factor in determining hole card quality is whether the hand will be more profitable if against many opponents or just a few (Steiner, 1996). Hands that play better against many opponents are called drawing hands. Drawing hands need help from the

community cards. With drawing hands, players will prefer to see a cheap flop with many foes. They want other players to create the correct odds by also putting their money in the pot. In these situations, players may not have the best cards to make an investment decision, but the pot odds will make it correct to play. Holding two high cards, two suited cards, or two connected cards are usually considered drawing hands. Specific characteristics of these drawing hand types will be discussed in detail in the following section.

Pocket Pairs.

When both cards are the same rank the hand is called a pocket pair (Rank of Hands, 2005). Caro (1996) values pairs because they do not necessarily need to improve to win. This is particularly true of two high cards. These hands are referred to as made hands (Burgess, 2004). Pocket pairs can be placed into three classifications, high pairs, middle pairs, and low pairs (Burgess, 2004).

High pairs are powerful before the flop because they will often prove the winning hand once the five community cards have been exposed. Ideally players with a high pocket pair would prefer to play against one or two other opponents who are holding lower pocket pairs. They do not want to be surrounded by many players with drawing hands. The middle pairs have many of the same advantages as the high pairs. However they do become vulnerable to high cards that hit the board on the flop. A low pair is virtually worthless after the flop. They will prove valuable only if trips are made on the flop (Steiner, 1996). Making trips will happen approximately 11 percent of the time (Warren, 2003). When small trips are made on the flop other players will find it very difficult to detect (Steiner, 1996).

Suited Connectors

The next classification is called suited connectors (Caro, 1996). Suited connectors are those starting hands such as a King of Hearts and a Queen of Hearts or an Eight of Diamonds and a Seven of Diamonds. These are also drawing hands. They are not likely to be currently winning, but they have potential (Steiner, 1996). Furthermore, they are attractive because they can improve to make either straights or flushes. For example, the 10-9 of spades has all the possibilities of 10-9 unsuited, plus the chance of ending up with a flush.

Suited Cards.

Occasionally players will hold two cards of the same suit that are not connected (Steiner, 1996). These may also prove valuable because a flush is possible. In Hold'em, a flush is exceptionally rare; therefore it will usually win. However, the benefit of holding suited cards before the flop is usually overestimated. While 40 percent of the time the exposed cards on the flop will contain three or more cards of the same suit, they will only match with a player's hand one quarter of the time. Players should only pursue these draws if the pot odds are favorable.

Connected Cards.

When the starting cards are not suited, but they are adjacent to one another in rank, players will be holding connected cards. Hands such as King-Queen, 10-9, or 6-5 are all examples of connected cards (Caro, 1996). These hands are sometimes referred to as touching cards. They are valuable because of the potential for making a straight. While it is possible for a straight to be made on the flop with connected cards, it is more likely to be made on the turn or the river. Generally speaking a player should see a cheap flop

with high touching cards (Steiner, 1996). However, with lower cards a player should not see the flop unless he is prepared to see at least two rounds of betting or the pot odds are tremendous.

Near Touching Cards.

The next hand class is called near touching or gapped. These are holdings such as J-9 or even Q-8. These hands are weaker (Steiner, 1996). However, they still have negligible value because it is still possible to make straights. The closer together the two cards are, the larger the number of possible straights they can make. If both cards are 10 or higher they are potential powerhouse holdings for two reasons. First, if they make a straight it will likely be the highest possible straight. Second, high cards have a greater potential if they pair the board.

High Cards.

The advantage of holding high cards is great especially if one of them is an ace (Steiner, 1996). These high cards can coordinate with the board to create the high the best hand. Even without a second high card, an A-9 or A-8 can be a useful holding even though it can fill no three-card straights. An ace with any other card is usually shown as (Ax). If the x card is paired, or becomes trips, or part of two pair, the ace may well prove to be the decisive kicker. As stated earlier a kicker is the second playable card used to break ties when two or more players share the same pair (Caro, 1996).

Rags and Trash Hands.

The last category of starting Hold'em hands is referred to as rags or trash hands. These are basically any hand that is not high, suited, or connected (Caro, 1996). While it is technically true that any to card holding can win these hands have a negative

expectation in the long run (Gordon, 2004). These holdings should be thrown in the muck unless the players are in the small or big blind, and there have been no raises.

Those are the general categories or classes of hole cards. Having this background information will assist in understanding the following section, which contains the exact ranking of the two card holdings and the groups in which they have been placed.

Ranking of Pre-Flop Holdings.

In a showdown game like Hold'em it is possible to calculated the value of all 169 possible starting hands with precision (Steiner, 1996). However, it should be noted that many experts view any actual definitive ranking of Hold'em hands to be infinitely debatable. The rationale behind the debate is the recognition that starting Hold'em hands are fluid by nature (Burgess, 2004). Every hand has unique attributes that allow it to move up or down on the power scale depending on the situation. It should be noted that most of the time an abbreviation is used to describe the hand.

There are several points to remember when reading about poker hands. Most of the time an abbreviation is used to describe the hand (Steiner, 1996). To describe a single card, the card rank is shown first and then the suit. Additionally face cards through tens use the first letter of the card rank. For example, an Ace of spades is depicted as (As). The A stands for Ace and the small (s) stands for spades. Seeing a (Ks) would be indicating the player holds a King of spades. The Queen of clubs is shown as (Qc), the Jack of clubs as (Jc), and the Ten of hearts as (Th). After the tens, the actual number of the card is shown first and then the suit. A (9h) is indicating the Nine of hearts, an (8d) is showing the Eight of diamonds, a (7c) says the Seven of clubs and so on.

A different method is use to show both hole cards. If the cards are suited a small (s) will be placed after the two letters depicting the cards. For example, if a player holds

the Ace and King of Diamonds, the abbreviation is Aks. If he had the Jack and Ten of hearts, his abbreviation would be JTs. If the cards are not suited then there will be no small (s) shown after the two cards initials. For example, if a player holds the Ace of Spades and the King of Diamonds, the abbreviation is simply (Ak). If he had the Jack of clubs and the Ten of hearts, the abbreviation would be (JT).

The Exact Rank of Hole Cards.

Professional poker players, mathematicians, and computer scientists have all attempted to place values on the hole cards based on their long term winning potential (Steiner, 1996). In some cases they have used experience and observation to determine the starting hand values. In other instances they have developed complex computer algorithms to calculate the worth of starting cards with exactness. Their resulting value is ultimately based on the probability that the hand will prove to be the winner after all the community cards have been exposed. The net effect of this work has been numerous starting hand charts and tables to guide beginning players.

The first people to assign a value to starting cards in Texas Hold'em were David Sklansky and Mason Malmuth (Poker Strategy, 2004). They are the co-authors of *Hold'em For Advanced Players*. Sklansky and Malmuth are men of mathematics (Gordon, 2004). Their chart of Hold'em hand rankings includes 73 playable hands. They rank each hand from best to worst and then put them into eight separate groups. After ranking the hands they provided advice on how to play the hands. When examining the starting hand charts, it can be seen how the information about hand traits and categories stated previously coincides with the hand rankings. Figure 7 includes Sklansky's Hold'em hand ranks and groupings.

Figure 7 - Sklansky's Hold'em Hand Ranks and Groupings

	Sklansky's Hold'em Hand Ranks and Groupings							
Group 1	AA	KK	QQ	JJ	AKs			
Group 2	TT	AQs	AJs	KQs	AK			
Group 3	99	JTs	QJs	KJs	ATs	AQ		
Group 4	T9s	KQ	88	QTs	98s	J9s	AJ	KTs
Group 5	77	87s	Q9s	T8s	KJ			
	QJ	JT	76s	97s	Axs	65s		
Group 6	66	AT	55	86s	KT			
	QT	54s	K9s	J8s	75s			
Group 7	44	J9	64s	T9	53s	33		
	98	43s	22	Kxs	T7s	Q8s		
Group 8	87	A9	Q9	76	42s	32s		
	96s	85s	J8	J7s	65	54		
	74s	K9	T8	43				

(Player's guide, 2002)

Recently a group of students at the School of Computer Science at Carnegie Mellon University (CMU) developed a Texas Hold'em computer simulation that tested Sklansky's and Malmuth's hand rankings (Poker Strategy, 2004). Their work was extensive. They actually created multiple table environments with players ranging from extremely tight to extremely loose (Players guide, 2003). Their computer simulation played millions of hands. This allowed the researchers to see how each of the starting hand held up under various game conditions. As a result, they have suggested several alterations to Sklansky's starting hand ranks. Figure 7 shows the CMU Texas Hold'em hand ranks and groupings.

Figure 8 - CMU Texas Hold'em Hand Groupings

	CMU Starting Hold'em Hand Groupings							
Group 1	**AA**	**KK**	**QQ**	**JJ**	**AKs**			
Group 2	**TT**	**AQs**	**AJs**	**AK**	**KQs**			
Group 3	**ATs**	**KJs**	**AQ**	**99**	**QJs**	**KTs**		
Group 4	**88**	**QTs**	**A9s**	**AJ**	**JTs**	**KQ**	**A8s**	**AT**
Group 5	**K9s**	**A7s**	**KJ**	**A5s**	**Q9s**	**T9s**		
	77	**J9s**	**A6s**	**QJ**	**A4s**	**KT**		
	QT	**A3s**	**K8s**	**JT**	**A2s**	**Q8s**		
Group 6	**T8**	**K7s**	**98s**	**66**	**J9s**			
	A9	**K6s**	**K5s**	**A8**				
Group 7	**87s**	**97s**	**K4s**	**Q7s**	**T7s**	**K9**		
	J7s	**T9**	**55**	**Q6s**	**Q9**	**K3s**		
	J9	**A7**	**Q5s**	**A5**	**K2s**			
Group 8	**Q4s**	**A6**	**T6s**	**J6s**	**A4**	**J5s**		
	K8	**Q3s**	**44**	**T8**	**A3**	**J8**		
	Q8	**K7**	**A2**	**K6**				

(Player's guide, 2002)

The odds of being dealt many of the two-card combinations are shown in Appendix C.

Basic Strategies for Playing Before the Flop.

As was stated earlier, the value of starting hands will move up and down depending on several factors. Volhaus (2004) has said that prior to the flop players should consider what power their position affords, determine what acts of aggression have been made by their opponents, and establish how well the characteristics of their hand matches the situation and game conditions. There will also be times when the pot odds or other game factors will make it correct for players to get involved (Hellmuth, 2003). If players choose to get play the hand, they will need to settle on the extent of involvement. (Hellmuth, 2003)

At this and every other point a decision is made, it is very important for players to take the needed time to make the best decision. When the action is intense it can be easy to get hasty. However, Hold'em players cannot afford to be rash. Taking some deliberate

time to reflect will allow players to breathe before committing to any action. It will also allow them to consider all the angles and find irregularities in their opponent's behavior (Gordon, 2004). These abnormalities might provide clues leading to better decisions. Even when players are sure of the right move, it is important to take a moment to think it through (Caro, 1996).

Basic Strategies for Playing Beyond the Flop.

It is important to know which cards have value before the flop. However, players must also know how to determine if their cards have retained or gained value after the flop (Gordon, 2004). At a full table good players will be folding the majority hands before the flop. Furthermore, most of the time they will be disappointed by the flop (Caro, 1996). Therefore, they will release a considerable percentage of their hands after failing to connect with those first community cards (Gordon, 2004).

After the flop, the action of players will depend on many factors. As a rule, however, none will have more weight than the exposed community cards. Stated simply, if the community cards do not coordinate with the player's hole cards, they should strongly consider getting out of the hand. The magic words after the flop are, fit or fold (Vorhaus, 2004). As a general rule, players should not continue beyond the flop without having a strong pair and a decent kicker. They may also continue with straight or flush draws if there are at least two opponents still engaged (Harroch, and Krieger, 2000). This will ensure the correct pot odds. Appendix D shows the outs and odds associated with various drawing hands. These percentages can be compared to the cost of continued play using the 2/4 rule (The 2/4 Rule For Calculating Odds, 2005).

Players must also consider that big pots will generally provide the correct odds for their opponents to call bets with their drawing hands (Gordon, 2004). Therefore, it will be critical to recognize the dangers presented by the flop. This is called reading the board texture. It may also be helpful to consider what is known about opponents, their style of play, and other information obtained pre-flop to employ a more advanced strategy like bluffing or advertising. These advanced options will be address in a following section.

Playing After the Turn.

Much of the time players will not be seeing the turn card (Harroch, 2000). They will have thrown away most of their hands before the flop and released many of the others after the flop. Many of the same considerations will apply on the turn as after the flop. However, folding a hand now is much easier as only one card remains (Steiner, 1996). Players who have made it to the turn should be holding a made hand, a promising draw, or believe that a bluff could pick up the pot (Harroch, 2000). These percentages can again be compared to the cost of continued play using the 2/4 rule (The 2/4 Rule For Calculating Odds, 2005).

Playing At the River.

Player is still contesting the pot when the river card hits, should have a strong hand. Once the river card is exposed, a hand no longer has potential. There are no more cards to come, so a player's hand value is fully realized. For this reason a player's strategic thinking has to change. Their decision to invest cannot be based upon future potential (Harroch, 2000). Occasionally players may employ some advanced tactic that causes an opponent to surrender the pot even when that opponent has the stronger hand (Gordon, 2004). These tactics will be discussed later in this review.

Making Observations.

Making key observations about the game and the players in the game is an important part of playing Hold'em (Hellmuth, 2003). There are numerous opportunities to gather information. In the beginning stages of a game or tournament is an ideal time to make key observations and gather information. Players can even question the opponents to obtain information about their game. There will be times when players are not engaged in the play of a hand. When this occurs, many will lose interest in the game (Vorhaus, 2004). Often they will turn their attention elsewhere. However, this is an excellent time to making observation about her opponent's style of play (Silberstang, 1996).

At the conclusion of every hand there will also be an opportunity to review the play of a hand. This is an unmatched opportunity for discovery (Vorhaus, 2004). Whether the players have won or lost the hand they should watch their opponents to see what cards they have played and how they have played them. By asking questions about the play of their rivals, players can identify and classify the strong and weak opponents (Silberstang, 1996).

Advanced Hold'em Concepts and Strategies.

There will be times when hand values, position, and probabilities will not be the determining factor in making a decision at the Hold'em table. In such cases, psychology, intuition, and logic will be more useful (Burgess, 2004). The following section addresses these topics as well as many of the advanced concepts and strategies that will be employed by experienced Hold'em players. In many ways players will not radically change their tactics when incorporating these advanced strategies (Gordon, 2004). They will continue play position and to use the concept of value investing prior to the flop.

They will invest in cards that have a positive expectation. After the flop they will continue to show discipline when the community cards have missed their hand. However, now players will begin to understand how the situational game condition will force adjustments in their game (Hellmuth, 2003). By adding some of these advanced strategies, players will be taking the next step toward becoming a situational expert and mastery of the game.

Reading Opponents.

The ability to gather information about opponents playing styles or tactics at the conclusion of a hand is a fairly basic skill (Caro, 1996). Players should learn to review the play of a hand and draw some fairly general, yet accurate conclusions about their opponent's intentions and methods of playing. Reading people is a learnable skill, although it will take practice (Hellmuth, 2003). It is possible for players who practice observation, logic, and deductive reasoning, while playing the game to determine how weak or strong their opponents are. Trying to guess an opponent's exact two hole cards is a great way to practice and develop this skill. In time players will be able to trust their judgment even when they are being severely tested.

Tells

Advanced poker is a game of getting and using information (Gordon, 2004). Therefore, good poker players are always observing their opponents to identify betting patterns and physical gestures that can provide clues about the player's strength and his intentions. These identifiable behaviors and mannerisms are called tells. Certain tells are universal, while others are unique to a particular individual. Some players give a way a lot of information through tells, while others are virtually unreadable. The capable of discerning tells is at a big advantage in the long run, especially if players can keep from

projecting their own tells (Picking Up Poker Tells By Observing Opponents). When players detect a tell they should not reveal the information to others (Caro, 1996).

Deceiving Opponents.

To many novice players, poker is all about the art of bluffing (Gordon, 2004). This should not be the case. While it is a key aspect of poker, it should be used sparingly and selectively. Bluffing is a deceptive and unwarranted act of aggression that is not as effective as many players believe. Bluffing involves betting or raising the pot when players believe they do not hold the best hand (Steiner, 1996).

There are several good times to bluff. The first is when players sense weakness in their opponents. The second is when the exposed cards may scare opponents into folding. There are two major advantages to successful bluffing. The first is that players can take pots from an opponent when their opponents hold a better hand. This allows players to win money that they would not otherwise be entitled. The second reason to bluff is more diabolical. When players get caught bluffing, they have made it more likely that they will get called in the future when they actually are holding the best hand (Cardoza, 1988).

Sometimes players will semi-bluff. This is a partial bluff (Burgess, 2004). When players are truly bluffing, they can only win if their opponent folds. When making a semi-bluff players can win the pot immediately if their opponents fold, or they can win it later if their hand improves to be the best. Semi bluffing is most often used to get a free card on a more expensive street. A semi bluff has a better chance of success if players making the play raised before the flop because their opponent will often assume the raiser has a big hand (Betting Versus Calling, 2004).

Choosing the Right Image.

Another form of poker deception is giving false information. Players can promote an image to the rest of the table (Caro, 1996). This is called advertising. Sometimes a wild playful image is profitable and sometimes a tight image is better. The most lucrative image to promote at the poker table depends on the opponents and the game tenor. Players should not advertise if they play to be playing only a short while because they will not be able to take advantage of their image.

Psychological Banter.

In Hold'em, as in other forms of poker, players must make correct decisions (Caro, 1996). The most common ways to interfere with an opponent's ability to make the correct decisions is to help them become emotional unstable or otherwise distracted (Gordon, 2004). Distracted players are losing players. There are a number of ways to accomplish this goal.

Delivering a bad beat is one way to get an opponent steaming and distracted. If done right, players will be chasing their money the whole session. Choosing an opponent to pick on can also be effective. It does not always work, but when someone is easily offended at the poker table, it can be an effective weapon. Slow rolling, is another proficient way to make enemies. This occurs when players take an unreasonably long time expose their winning hand. Meaningless chatter is another way to annoy and engross opponents. The trick is to provide as much annoyance and distraction as possible without making people so aggravated that they leave the table.

Showing Cards.

Many professionals do not show their hole cards to opponents (Gordon, 2004). They do not want to share any information or give opponents the satisfaction of increased awareness about how, or what they play. However, some opponents are particularly

susceptible to tilt. If players recognize this tendency in opponents, they may want to reveal a particularly effective bluff. This can unsettle even the best players. It may also set the stage for a future tactical play against the same opponent or others who have been watching.

This concludes the section on Texas Hold'em. To gain a more thorough understanding of the game one should use the sources listed in the references. The following section will discuss problem solving and decision making.

Problem Solving and Decision Making

In support of the purpose of this study, it is necessary to examine various decision-making techniques, tools, processes, and models to see which, if any, can be applied to the game of Texas Hold'em. Group decision-making concepts, such as brainstorming and nominal group techniques are not studied unless individual decision-makers can also apply them. The reason for this exclusion is that Hold'em is a game with no components of group decision-making. Although players will acquire information from players at the table they are not allowed to practice collusion.

Decision-making.

Any discussion of decision-making will often be accompanied by the term or concept called problem solving (Problem Solving and Decision Making, 1992). Experts often describe the problem-solving processes in phases or stages. Each stage of the process includes specific steps to be completed before moving to the next. The process begins with the notion that a gap exists between the desired and current states. Individuals will detect an obstacle or multiple obstacles between their present situation and their desired goal.

Next, they will decide exactly what the problem is (Certo, 2003). After that, they will employ various methods to find a suitable course of action. The process concludes by implementing and assessing the solution to see if the changes actually fill the gap (Problem Solving and Decision Making, 1992). Hence, successful problem solving often depends on making a number of good decisions (Certo, 2003). These stages of the problem solving process will be discussed in more detail later in this paper.

In contrast to problem solving, the decision-making process is often described as a selection procedure (Moorhead and Griffin, 2004). Frequently, individuals will be presented with multiple possible solutions to a problem that is known. Then the individuals simply select one alternative from among the possible alternatives. Depending on the circumstances, any one of the alternatives might be correct. This differs from problem solving in that the problem is known beforehand. Selecting the correct alternative is the essence of good decision-making (Problem Solving and Decision Making, 1992).

Although there are sometimes subtle differences stated between the two concepts of decision-making and problem solving, the steps in both processes are quite comparable. Therefore, in practice, and for the purpose of this study, the terms are used interchangeably. Additionally, the terms situation and opportunity will occasionally be used instead of the word problem.

Information Conditions Required for Decision Making.

Individuals make thousands of decisions of every day (What is decision making, 2005). In the process of making these decisions they will rely on pertinent data or information to assist them. The information available to decision makers will vary

greatly. The amount and quality of the information available to decision makers will determine how they choose from the alternatives. It will also influence how accurately they are able to estimate the probability of an event occurring based on a specific choice. When predicting an outcome, the assurances of accuracy range somewhere between continuums of complete certainty and complete uncertainty.

At various points amid this scope of certainty, decision makers will have varying amounts of knowledge concerning possible outcomes (Moorhead, 2004). Under conditions of complete certainty, individuals know the outcome of each alternative. When decision makers have enough information to estimate the probabilities of occurrence, but cannot say with complete certainty what the outcome of an action will be, a position of risk exists. With conditions of complete uncertainty, decision makers are lacking sufficient information to even estimate the probability of an outcome.

Problem Types.

There are two basic types of problems (Certo, 2003). They are acute problems and chronic problems. Acute problems occur suddenly. Identifying the cause of an acute problem can often be done quickly. In most instances, individuals will have little need for a decision-making model to solve an acute problem, as the answers are frequently quite apparent. Chronic problem, on the other hand, are typically more complex. They will often be more difficult to determine the causes and solutions. These types of problems can benefit from the conscious use of problem solving or decision-making models.

Types of Decisions.

There are also two basic types of decisions programmed and nonprogrammed (Moorhead, 2004). There are a number of characteristics that differentiate the two classes. Programmed decisions and their accompanying solutions are repetitive, well

structured, and routine (Leonard and Hilgert, 2004). They recur frequently enough for a decision rule to be developed. A decision rule explicitly declares which alternative to should be chosen. The determination is often based on the results from similar issues in the past. Decision rules are frequently used with well-structured problems because they are simple to follow and ensure consistency (Robbins, 2001). Additionally, the highly structured nature of a programmed decision does not normally require creativity or advanced problem solving processes (Moorhead, 2004). Programmed decisions are often associated with acute problems (Certo, 2003).

When decision makers are unable to rely on an established decision rule, the decision is identified as a nonprogrammed decision (Moorhead, 2004). Nonprogrammed decisions require problem-solving behavior to be exercised. They require individuals to use objective judgment and adaptive creativity (Leonard, 2004). They can be poorly structured, with ambiguous information, and goals that are vague (Moorhead, 2004). In many cases, the impact of a nonprogrammed decision is significant. Therefore, an individual should take more time to decide. He must consider all the implications of his decision (Certo, 2003).

Decision Making Styles.

Decision maker are unique in the set of personality characteristics they he bring to the effort of problem solving (Robbins, 2001). Therefore it is helpful for decision makers to understand which tendencies come naturally and which will require conscious effort. There are essentially two dimensions for individual differences. The first is the way in which individuals think. Some individuals process information in a sequential manner. They tend to think rationally and logically about an issue. Conversely, others have a propensity to access the creative side. These individuals also use more intuition as a basis

for making decisions. The second dimension centers on an individual's tolerance for ambiguity and uncertainty. When these two dimensions are diagramed, four distinct decision making styles are formed. They are directive, analytical, conceptual, and behavioral.

Rational thinking and a low tolerance for ambiguity are among the characteristics of the directive style decision maker. These individuals exemplify decision-making speed and efficiency in the short term. An analytical decision maker has a high tolerance for ambiguity in conjunction with rational thinking.

Analytical decision makers carefully consider many alternatives before a decision is made. Therefore, the desire for complete information and abundant time are foremost concerns. Conceptual decision makers have a high tolerance for ambiguity. They look broadly at many alternatives while using creative approaches to solve long-range problems. The behavioral decision-making style is characterized by a low tolerance for ambiguity and intuitive thinking. The ability to work well and empathize with others two of the attributes exhibited by behavioral decision makers.

Decision Making / Problem-Solving Tools and Techniques.

There are various tools, techniques, and processes available to help individuals select alternatives. Understanding how these tools work can help improve decision-making (Certo, 2003). The following section includes an examination of many of the tools and techniques used in the decision-making process. By using them appropriately, in conjunction with the available information, individuals will have a better chance of making quality decisions (Decision Making Techniques, 2006). The methods can also assist decision makers when attempting to anticipate the likely consequences of their decisions.

Some of the approaches focus on logical processing and critical thinking while others target creative and divergent thinking (Problem Solving and Decision Making, 1992). Assortments of the tools help individuals understand multifaceted and difficult situations, while others are better suited for less complex issues. In either case, the tools and techniques can help individual more confidently conduct a systematic analysis of the issues at hand (Introduction to Problem Solving Skills, 2006). Later it will be shown how these tools and techniques can be integrated into the decision-making processes and models that are scrutinized.

A number of measures examined are geared toward individuals with a more linear, serial, structured, rational, analytical, and goal-oriented approach to problem solving (Problem Solving and Decision Making, 1992). Other practices are better suited to individuals who prefer an approach that is more holistic and parallel. These individuals use more emotion and intuition during the decision making process. They also tend to be more creative, visual, and prefer kinesthetic stimulus. Ultimately, many believe it is important to integrate appropriate amounts of both processes into the problem-solving process. The decision-making tools and techniques discussed here are not meant to compile an exhaustive list.

A Pareto Analysis is the first tool examined. This simple tool is predicated on the use of the Pareto principle (Pareto Analysis - Choosing the Most Important Changes To Make, 2006). The Pareto principle states that 80 percent of the value results from 20 percent of ones effort. The analysis is performed to help identify which changes will provide the most benefit. It is particularly useful when competing possibilities exist.

The next decision-making tool examined is called Paired Comparison Analysis. This tool is used to evaluate the relative importance of competing options when there are conflicting demands on a limited number of resources (Paired comparison analysis - Working out the relative importance of different options, 2006). It is particularly useful when objective data on which to base a decision is minimal (Leadership Decision Making, 2006).

A grid analysis is another useful technique used to make decisions. It is particularly useful when the factors to consider are many and a number of good alternatives exist. (Leadership Decision Making, 2006) A grid analysis is also known as decision matrix analysis or Pugh matrix analysis (Grid Analysis Making a Choice Where Many Factors Must be Balanced, 2006).

Another tool that is often used by decision makers is called a decision tree. This is an excellent tool when the choice between several courses of action is unclear (Decision Tree Analysis Choosing Between Options by Projecting Likely Outcomes, 2006). The structure of a decision tree is an effective way to shape a balanced representation of the risks and rewards associated with each possible course of action. Decision trees are very useful when presenting problem conditions to others involved in the decision-making process (Certo, 2003).

The PMI mechanism is further decision-making technique. PMI stands for Plus/Minus/Interesting (PMI Weighing the Pros and Cons of a Decision, 2006). This technique is also called the pros-cons-interesting implications method. (Leadership Decision Making, 2006). The PMI allows a person to see if a course of action is going to actually improve a situation (PMI Weighing the Pros and Cons of a Decision, 2006). It is

a good way of weighing the pros, cons, and implications of a decision. Sometimes individuals will determine that it is best to do nothing. The subjective nature of the PMI is its main drawback (Leadership Decision Making, 2006). Therefore, defending a decision with an undesirable outcome is not always easy if others have been affected.

A force field analysis is a specialized method of weighing pros and cons (Force Field Analysis - Understanding The Pressures For and Against Change, 2006). It allows decision makers to analyze the pressures in support of and those against a decision. It is helpful for weighing the importance of the factors and deciding whether or not a plan is worth implementing. The analysis can also be used to strengthen the forces supporting a decision or to reduce the impact of opposition to it.

Using a method called the six thinking hats is another powerful technique for decision-making. It allows the individual to view a decision from various perspectives (Six Thinking Hats Looking at a Decision From All Points of View, 2006). The technique forces decision makers to think outside their typical thinking style. The technique mixes data, emotion, caution, optimism, creativity, and process control. Using it can help avoid making a commitment to the wrong course of action.

A cost/benefit analysis is another technique used by decision makers. The tool is simple and widely used (Cost/Benefit Analysis Evaluating Quantitatively Whether to Follow a Course of Action, 2006). The method allows individuals to compare the costs and any potential gains resulting from a decision (What strategies should I use to analyze and make decisions, 2006). Ultimately, it can validate or negate the worth making a change.

The 5 whys method is one more elementary problem-solving technique. It can help the users get to the root of the problem quickly (5 Whys - Quickly Getting to the Root of a Problem, 2006). The process can be used on any problem. It begins by looking at the issue and asking: "Why?" and "What caused this problem?" In many cases, the answers to these first questions will prompt others and the answers to those will trigger yet another, and another, and so on.

Appreciation is another very simple yet powerful technique providing a structure within which to extract information quickly and reliably (Appreciation - Extracting Maximum Information From Facts, 2006). The process begins by stating a fact. The statement of fact is followed by asking the question "So what?" This question is asked continually until decision makers have drawn all possible assumptions and implications surrounding the fact.

To break complex problems down into progressively smaller parts an individual can use the drill down technique (Drill Down - Breaking Problems Down Into Manageable Parts, 2006). This process helps to provide a full understanding of all the contributing factors to a problem. Drilling into a question can help link in hidden information associated with the problem and provide deeper understanding. It will also identify areas where further information is needed.

Identifying the likely causes of a problem can be done using a cause and effect diagram (Cause & Effect Diagrams - Identifying the Likely Causes of Problems, 2006). These are also called fishbone and Ishikawa diagrams. The method provides a structured way to expose all probable causes of a problem allowing a thorough situational analysis.

A SWOT analysis is a simple process for considering the strengths, weaknesses, opportunities, and threats (Personal SWOT Analysis - Discover new opportunities. Manage and eliminate threats, 2006). The strengths and weaknesses are generally considered to be internal to the organization while the opportunities and threats are related to external factors. Consequently the SWOT analysis is sometimes referred to as an internal-external analysis. The external analysis will often focus on both micro and macro factors. Conducting the SWOT analysis highlights capabilities and opportunities while at the same time helping to bring problems into perspective.

A risk analysis allows an individual to uncover and examine the hazards that might be present in a given situation (Risk Analysis & Risk Management - Evaluating and Managing the Risks You Face, 2006). The approach is a structured way of supposing possible threats. The initial threat assessment is followed by an honest appraisal of the probability and cost of such events occurring. From there existing resources are directed toward prevention, new resources are obtained and contingency planning takes place. Risk analysis forms the basis for the science of risk management and crisis prevention.

Porter's 5 forces tool is an effective and simple means of determining where the power lies in a situation (Porter's Five Forces - Assessing the Balance of Power in a Business, 2006). The tool facilitates the assessment of five key factors. They are: supplier power, buyer power, competitive rivalry, threat of substitution, and threat of new entry. Understanding the power allows individuals to take full advantage of a strength situation, improve a situation of weakness, and avoid missteps.

In an effort to discover, understand, and adapt to the environmental realities, a PEST analysis can be a useful tool (PEST Analysis - Understanding "Big Picture" Forces

of Change, 2006). PEST represents the political, economic, social, and technological factors within the environment. The analysis can help to uncover powerful forces affecting change within the larger environment. The increased awareness of these change factors provides the context within which more detailed planning can occur. The planning allows an individual or organization to take advantage of the opportunities present and to avoid actions that are disaster-prone.

Inductive reasoning is another decision-making technique. Essentially it is the ability to draw together an inevitably limited number of observations regarding outcomes, and events to reach an integrated conclusion (Inductive Reasoning, 2006). At one extreme the process of inductive reasoning is intuitive and automatic. In such cases individuals will solve problems based on successes claimed in previous situations. At the other extreme, inductive reasoning involves the rigors of the formal scientific method.

Some forms of negotiation also relate to decision-making (Moorhead, 2004). In particular, game theory attempts to use mathematical models to anticipate every possible alternative, predict potential outcome, and the estimate the probability of occurrence. However, it is seldom possible to predict every possible alternative and outcome. Therefore, game theory will often make elegant predictions do not work in reality.

Behavioral Approach and Decision-Making Limitation.

Before discussing the various decision-making models, it is important to understand the common difficulty in the process brought about by human limitation (Moorhead, 2004). The following section discusses many of these restrictions.

The behavioral approach is one school of thought that recognizes the human constraints in the decision-making process. Many of these traps are unconscious (More of the most common decision-making mistakes people make, 2006). The concept of bounded rationality asserts that rational decision-making is beyond the capabilities of most decision makers (Moorhead, 2004). The approach suggests that individuals will often attempt to solve problems by incorporating subjective and emotional methods to select a convenient alternative.

When decision makers fail to use a process that it exhaustive and rational they will often accept solutions that are sub par (Leonard, 2004). In many cases the decision may feel right at the time, but the nature in which it came about can lead to unintended aftermath. Successful decision-making will require an individual to avoid the psychological traps and errant approaches. Therefore before any discussion of decision-making models or processes, these pit falls will be described.

Decision-Making Pit Falls.

When decision makers consider only ways in which a similar problem was handled in the past they can overlook original and inventive solutions to a problem (Leonard, 2004). This is called simplicity. Similarly, the syndrome of recency occurs when only the most recent events are remembered and referenced in the decision making process. Another flawed tendency of human decision makers is the assumption that everyone's understanding is the same. This is called personal perspective. Stereotyping

occurs when the rigid opinions regarding categories of people are used as a source of information. This is also a mistake.

When one considers alternatives resulting from the standpoint of intuition or gut instincts he is using subjective rationality. Using it in the decision-making process can lead to inaccurate results. Satisficing is another error that occurs when the search for alternatives stop when only until minimal requirements are discovered (Moorhead, 2004).

Self-doubt, anxiety, and hopelessness can also interfere with good decision-making (Decision-making and Problem solving, 2006). Conversely an exaggerated notion of self may also lead to poor decisions. Being over-confident can cause unwarranted optimism. In such case high-risk decisions are often made (Leadership Decision Making, 2006). An unhealthy desire to be liked can also interfere with the decision maker's ability to be objective (Decision-making and Problem solving, 2006).

Wishful thinking is yet another inclination that interferes with decision-making. (Decision-making and Problem solving, 2006) Perfectionism, oversimplification, a need to have it all, and hoping for something better are all manners of wishful thinking and should be avoided (Decision-making and Problem solving, 2006).

When highly desirable the alternatives must be rejected post-decision anxieties can occur (Leadership Decision Making, 2006). This is also known as cognitive dissonance. When this happens individuals tend to accentuate the positives of the alternative selected. Conversely they often refute or overlook the positive aspect of the rejected options. The more quickly the decision was made the more prevalent the anxiety. Post-decision anxiety can lead to future decision-making avoidance (Decision-making and Problem solving).

Human emotions can have a negative effect on decision-making. When feelings block clear thinking, individuals can become either impulsive or indecisive (Decision making and Problem solving, 2006). In some instances, fear can cause individual to knowingly accept less than the best possible outcome (Moorhead, 2004). This is called sub optimizing. Sub optimizing is an attempt to avoid any of the negative effects brought about by choosing a better alternative.

When decision makers seek information to support their point of view, while at the same time denying contradictory information, they are in the confirming evidence trap (More of the most common decision-making mistakes people make, 2006). This bias promotes the collection and interpretation of evidence to reinforce a current stance. Confirming evidence occurs for two reasons. First, individuals will often allow their better judgment to give way to his initial emotional bias. They will subconsciously decide what he wants to do, before he knows why he wants to do it. Secondly, individuals have a natural inclination to be more engaged by, and supportive of, things they are partial to.

Estimating and forecasting traps can also be problematic. Forecasting and estimating mistakes are made three ways. The first is to be overconfident of ones ability to predict. In such cases people set the range of possibilities too low. Secondly, others have a tendency to be overly cautious or prudent when forecasting. This can cause giving credence to possibilities even though the odds of occurrence are minuscule. Being overly prudent can cause long delays in the decision-making process (Leadership Decision Making, 2006). Lastly, recall ability can inhibit forecasting (More of the most common decision-making mistakes people make, 2006). It occurs when individuals are overly influenced by the memory or impression of some dramatic or traumatic event.

The tendency to persist in a course of action when evidence indicates it infectiveness is called the escalation of commitment or sunk-cost conscious (Moorehead, 2004). High up front investment, ego, social structure, norms, group cohesiveness, and organizational inertia are all causes of this trap. Having regular project reviews and maintaining a high level of information regarding the ongoing potential of a project can minimize the effects of commitment escalation.

Deferring decisions to astrology, palm reading, stargazing, telepathy, telekinesis, the aura, crystals, dreams, colors, numerology, fortune-tellers, etc. are all examples of recourse to someone or something else (Leadership Decision Making, 2006). Despite what some believe, these are not the tools of an effective decision maker.

Passing the decision responsibility to someone else, being resigned to failure, poor problem definition, using conventional wisdom, misunderstand the problem, over complexity, rationalization, reasoning by analogy, invalid information, accepting false alternatives, being symbolic, obligations, compliance, declining responsibility, misattribution of causes, coercion, victimization, self pity, improper framing, and self-defeating behavior are all further examples of decision-making traps (Leadership Decision Making, 2006). Lastly, a failure to use easily available information in an effort to save time can spell decision-making disaster (Certo, 2003).

General Decision Making Tips.

Many of the traps previously mentioned are not solitary concerns (More of the most common decision-making mistakes people make, 2006). They work in concert with one another, thus amplifying the power of distortion. In this section a few general tips for good decision–making are considered. Later in this review several decision-making models will be examined. Many of these guidelines will make there way into the steps or phases of the more commonly used processes.

In an effort to make good decisions, individuals should: examine all the evidence with equal rigor, avoid the tendency to accept confirming evidence without question, build counter-arguments, check motives, and seeking advice from unbiased individuals (More of the most common decision-making mistakes people make, 2006). People should never make decisions while in a revelation state (Leadership Decision Making, 2006) They should practice good planning, keep the proper perspective, take responsibility, learn from mistakes, move beyond mistakes, look for precedents, consult experts, and be realistic (Certo, 2003). Furthermore, good decision makers will avoid emotional attachments to one outcome, they will take the needed time, be open minded, use objective criteria, and admit and rectify errors (Leonard, 2004).

Good decision makers will exhibit a number of characteristics. They will have a high tolerance for ambiguity and a well-ordered sense of priorities (Leadership Decision Making, 2006). They will practice good listening skills and look for ways to build consensus around a decision. They will avoid making stereotypes. They will remain flexible, be comfortable with input that is hard or soft, and be realistic about costs and difficulties. Effective decision makers will consider consequences of a decision. When the consequences are great, they he will collect ample information and examine

numerous alternatives (Certo, 2003). When the consequences are slight, time and other resource will be limited. They will be patient, however, they will not miss opportunities because of fear or hesitancy (What should I do in preparation for making a decision, 2006)

Good decision-making will require adequate study of the problem to distinguish the risks and opportunities ignored by many (Moorhead, 2004). Everything about a situation should be understood to avoid surprises later in the process. It will also be important to have a contingency plan. These are alternative actions to be taken should the primary course of action be unexpectedly disrupted or rendered unsuitable.

The ability to find hidden opportunities within a problem is the mark of a great decision maker (How to Make Good Decisions, 2006). In many cases a problem will have hidden in it an opportunity that is so commanding that it categorically obscures any obvious difficulty. The ability to see this will depend greatly on the decision-maker's attitude. A pessimist sees only the difficulties presented in the opportunity, while the optimist finds the opportunity in every difficulty. In the end, having the right information, adequate time, and the willingness to consider all the options will provide the best chance for decision-making success (What should I do in preparation for making a decision, 2006).

Decision-Making Models and Processes.

This section examines several models and approaches to decision-making. Some examiners believe that a decision-making model should help the individual arrive at a decision based on facts and analysis rather than opinions, intuition, or feelings (Certo, 2003). However, many other researchers recognize that the decision making process is most effective when both the logical and lateral or creative parts of the brain are active

(Problem Solving and Decision Making, 2006). This view recognizes that there are innate individual differences that determine how people process information. Examples from both decision-making genres will be examined below.

Most of the models or processes used for problem solving and decision-making include multiple steps or phases. (Problem Solving and Decision Making, 2006) Some incorporate numerous steps while others include only a few steps. In the end however, the more popular models have many similarities (Certo, 2003). Some of the tools and techniques discussed earlier can be observed being applied intermittently during these various phases (Problem Solving and Decision Making, 2006) Throughout the processes it will also be necessary to use the decision-making tips, and avoid the traps mentioned earlier.

Four Phases Model.

The first model is referred to as the Four Phases Model. Each phase of the process includes a number of specific steps that need to be completed before moving to the next phase. The first phase is called the input phase. This is the point at which the problem is alleged and an attempt is made to clearly understand it. Secondly, a processing phase occurs. Here, various alternatives are generated and evaluated. Selecting a suitable solution is the aim at this stage. The output phase is third. At this juncture, planning for, and implementing the solution is included. Lastly, the review phase takes place. At this point the solution is evaluated and any necessary modifications are made.

Rational Approach Model.

Another decision-making model is called the rational approach model. Moorehead, (2004) identifies the steps of the rational model as follows: 1. State the situational goal, 2. Identify the problem, 3. Determine the decision type, 4. Generate

alternatives, 5. Evaluate alternatives, 6. Choose an Alternative, 7. Implement the plan, and 8. Control, measure, and adjust. Although it is not shown in the steps listed above, information is interjected at each step of the process. (Problem Solving and Decision Making, 2006) Many of the tools and techniques discussed earlier can be applied intermittently, as appropriate, during these various phases of the ration model.

The rational approach to decision making assumes that individuals follow a step-by-step process to systematically arrive at a decision (Moorhead, 2004). Each of the steps in the process is important in developing an appropriate solution to any problem. The amount of time spent during each step will fluctuate according to the nature of the situation, the importance of the problem, and the information available concerning the circumstances (Leonard, 2004). The rational approach also presumes that decision makers are utterly objective and have complete information upon which to base their decisions.

The rational approach forces decision makers to consider a decision situation in a logical, sequential manner (Moorhead, 2004). An analysis of the alternatives enables the decision maker to select an option based on information rather than on emotion or in response to social pressure. Limitations of the rational approach are as follows: The amount of information available usually is limited by time or cost constraints. Most decision makers have a limited ability to process information regarding alternatives. Not all alternatives lend themselves to quantification in terms that will permit easy comparison. Decision makers cannot know all possible outcomes of each alternative.

Individual will not always have the time or the desire to follow these steps for every problem they face or decision they need to make. There are a number of factors that explain this truth. They may encounter difficulty generating alternatives or gathering

the facts needed to make a sound decision. In addition, human limitations will often bring about compromises in the process. When the individuals are unaware of the frequent compromises made during the process it is less likely she will consciously avoid using them (Certo, 2003). Decision-makers also need to understand that there are powerful psychological forces that hinder rational decision-making (Decision-making and Problem solving, 2006).

The Practical Model.

The practical model is very similar to the rational model. The steps in the process are exactly the same; however the conditions specified by the behavioral approach are incorporated. By combining the beneficial features of the rational and behavioral approaches the practical model provides a more realistic framework (Moorhead, 2004). The main case in point occurs in step six. Here decision makers will select the best alternative by relying on their experience, intuition, advice from others, experimentation, and statistical and quantitative data (Leonard, 2004). Appendix E includes an example of the Practical Model

The Personal Approach Model.

The personal approach is another model for decision making (Moorhead, 2004). It makes five powerful assumptions. The first is that important only life decisions are involved in the process. Secondly, procrastination and rationalization are recognized as means by which difficult decisions are avoided. Third, the acknowledgement that some decisions will likely be wrong is explicit. Furthermore, the fear accompanying the notion of being wrong can discourage the making of any decision. Fourth, the use of internalized moral standards for alternative comparison and self-reactions is provided in the process.

Lastly, it recognizes that a decision maker's ambivalence concerning options may make a wholehearted commit to a single choice difficult.

The personal approach process begins when information regarding an opportunity or challenge reaches an individual who is engaged in ongoing activity. Next, individuals must decide whether to change based on the realization that change might improve their situation. If a change will improve their situation then the risk of not changing is evaluated. If the risks of not changing are minimal, and no change is made, the action is described as unconflicted adherence. On the other hand, if changing is not a high-risk proposition and a change is made, the action is referred to as unconflicted change.

When the hope of finding a better solution is unrealistic and no change is made, the action is said to be defensive avoidance. Defensive avoidance entails no changes in present activity and a deferral of contact with associated issues in the future. Hyper vigilance is the frantic, superficial pursuit of a satisficing strategy. This is often due to having an insufficient time to search and deliberate options. Decision makers who carefully evaluate the consequences of all alternatives and diligently prepare contingency plans are practicing vigilant information processing. Vigilant information processing involves thoroughly investigating all possible alternatives, weighing their costs and benefits before making a decision, and developing contingency plans.

Taxonomy

The following section considers the concept of taxonomy. Later this information will be analyzed to establish if it can be applied to the game of Texas Hold'em stratagy. To begin, the definition of taxonomy needs to be clear. According to sources, the term refers to the scientific principles or rules of classification. It further involves the division of collections or clusters into controlled groups or categories (5 entries found for

Taxonomy, 2006). These sorts occur based on a natural relationship of similarities of unit structure or origin. Additionally, ttaxonomies are frequently in a structure that is hierarchical (Taxonomy, 2006).

Originally taxonomy was used only to describe the science of classifying living organisms (Taxonomy, 2006). Today, it may refer to the classification of animate or inanimate objects and things, or the principles underlying the classification of those things. In some fields thee term systematics is used synonymous with taxonomy to describe the general principles of scientific classifications (5 entries found for Taxonomy, 2006). Other connections are made between taxonomy and Ontology (Ontology, 2006). Ontology refers to a collection of objects or events that share some characteristics. Both entities and the mental events of people comprise these collections. When used to describe mental events, ontology is said to be the study of conceptions of reality.

Bloom's Taxonomy.

One notable example using the concept of taxonomy is observed within setting of education (Learning Domains, 1999). During the mid 1950's Benjamin Bloom led a group of educational psychologists to create a taxonomy that categorized the abstraction level regarding test questions. To begin with, Bloom and his committee of colleges identified three domains of educational activities. They are the cognitive, psychomotor, and affective domains. These domains are often referred to as knowledge, skills, and attitudes (KSA's) respectively. In practice, the taxonomy of learning can be considered the training goals and objectives.

This compilation further divides each of the three domains into subdivisions beginning with the simplest, and ending with the most complex level of abstraction. Within these subdivisions are verbs representing the intellectual activity on each level.

These verb examples or question cues are often used to prepare materials for testing. The domains and subdivisions are not absolutes. Other systems or hierarchies have been developed; however, Bloom's taxonomy is perhaps the most easily understood and widely applied.

e-Learning

The last section of this literature review examines the issue of e-learning. Later this information will be analyzed to determine if the topical information compiled regarding Texas Hold'em, decision-making, and taxonomy can be synthesized to create on-line training modules that display multi-level strategic assertions under live Texas Hold'em game conditions.

What is e-Learning.

There are essentially two major views regarding the definition of e-Learning. The first is very encompassing. The American Society for Training & Development (ASTD) describes e-Learning as the delivery of content via the Internet, intranet, extranet, audiotape, videotape, satellite broadcast, interactive television, and CD-ROM (The Three Views of e-Learning, 2004). The ASTD is essentially saying that e-Learning includes the assistance of one or more electronic devices.

A second, narrower view claims that e-Learning takes place through the Internet only. It maintains that e-Learning is the online delivery of information, communication, education, and training. It further asserts that the training content resides on a host computer that is connected to the World Wide Web. For the purpose of this paper, it can be accepted that e-Learning is really a combination of the two primary definitions. Ultimately, e-Learning is the delivery of learning content without the presence of a

human instructor using computer technologies as the interface between the training content and the learner.

Advantages and Disadvantages of e-Learning.

There are a number of advantages and disadvantages associated with e-Learning. First the advantages will be examined. The ease and flexibility of training delivery to the learner is a definite advantage (The Three Views of e-Learning, 2004). Anyone with a personal computer and access to the Internet can take part in Web based e-Learning. Moreover, if the content is on a compact disk, then a personal computer is all that is necessary. Another advantage is that the training can be directed toward groups or individuals. Furthermore, the group learning can be asynchronous or synchronous.

Reduced travel costs also are seen as beneficial. (What Should Be Taught Via the Web, 2005). The fact that e-Learning provides immediate feedback to the learner is another benefit. The ability of e-Learning to present content from the elementary to mastery levels, at a pace suitable to the learner, is a definite plus (What is Web-Based Training, 2004). The ability of users to multitask is leading the growing level of e-Learning acceptance. Lastly, e-Learning can be designed to run on Windows, Mac, UNIX, PDA, or other wireless devices.

A number of disadvantages regarding e-Learning are also present. Learners sometimes find that working on a computer for long periods of time is difficult (What is Web-Based Training, 2004). Human interaction is minimal. Development time can be extremely long. The limitations of low bandwidth or browsers restrictions may regulate instructional methods and result in slow performance for sound, video, and intense graphics (The Three Views of e-Learning, 2004). The need to provide server access and control usage may also restrict e-Learning applications.

What Can Be Taught Via the Web?

Currently, organizations are using the e-Learning platform to focus mostly on the training of procedural topics, while avoiding emotionally sensitive subjects or those requiring motion or hand-eye coordination (What Should Be Taught Via the Web, 2004)

The Development Process of e-learning.

When designing e-learning materials there are eight rules to keep in mind (Rules for Good Design, 2004). First it is important to establish a formal development process. Secondly, the media type should be chosen based on the learning objectives. Third, the user should be given ample opportunity to interact with the information. Fourth, the product design needs to adapt to the user. Fifth, the variety in which people learn should be considered. Sixth, the designer should reject linear thinking and abandon linear design. Seventh, good design respects the learner. And finally, the design should be tested on real users. In many ways the tenets of e-learning design replicate those of the Instructional Systems Design (ISD) model used for the developing traditional learning materials for the classroom.

E-Learning Design Elements.

Instructional designers, subject matter experts, and programmers are working together to design e-learning materials that provide high levels of user interaction (What is Web-Based Training, 2005). Three of the more successful e-Learning design elements include the use of games, drills, and simulations (Training Media Dictionary, 2001). Games are simply learning activities presented in a game format. In order to strengthen rote knowledge individuals will use drills to practice previously learned material. A simulator is model of a real situation that requires the learner to accomplish a real world task. Each of these is being used to enhance the learning experience.

Chapter III: Summary, Analysis, and Recommendations

Introduction

Thus far this paper has been a compilation of information concerning the topics of Texas Hold'em, problem solving and decision making, taxonomy concepts, and e-Learning. The information came from a review of literature relate to each of the topics. In the summary that follows the key concepts regarding each of the topics will be underscored. Following the summary is an analysis of the data. The analysis answers the key questions of the study. Lastly, a recommendations section suggests further study of the primary topics and other related subjects.

Summary

Each of the major topics of study are summarize in the following section.

A Summary of Texas Hold'em.

Millions of people worldwide are playing Texas Hold'em (Poker Corner History, 2005). Intense media exposure and the ease with which one can learn and play the game are the two main factors contributing the high interest (Harroch, 2000). Hold' em's rules and structure allow even novice players to understand the game. Most will have the ability to be playing relatively well with a few hours of practice (An Introduction To Texas Hold'em Poker, 2002). Players also like Hold'em because it is a fast game that generates big pots (Warren, 2003). Lastly, Harroch (2000) suggests that Hold' em's blend of strategy and psychology makes it the perfect poker game.

The rules of Texas Hold'em make it appear deceivingly simple (Harroch, 2000). In actuality Hold'em can be a very tricky game to play (Caro, 1996). The analytical nature of the game requires both strategic prowess and astute people skills (Harroch, 2000). Winning players need to balance numerous strategic concepts and be capable of

applying them at precisely the correct moment. Fortunately, many of the games top professionals have written on the subject of Hold'em and its strategy. There are literally hundreds, of articles, dozens of Internet sites, and scores of books on the subject of Texas Hold'em.

To begin with game conditions and betting limit variations will require players to make strategic adjustments. An approach that might work well at a low limit Hold'em table will fail miserably at a no-limit table (Basic Texas Hold'em Strategy, 2005). With that said, there are a number of fundamental concepts applicable to all Hold'em games regardless of the brand.

In Hold'em, the play of a hand can be divided into four major phases. They are: pre-flop, the flop, the turn, and the river (Warren, 2003). Hold'em players will essentially make two key decisions during every hand of play (Steiner, 1996). First, they must decide whether to pay to see the flop. The second decision will be whether to continue after seeing the fit between their hand and the community cards exposed on the flop. The decision to check, bet, call, raise, or fold is be made at each stage of the hand. Players may also consider which of the numerous advanced strategies to employ at each of these junctures.

Playing position properly, patience regarding hand selection, and sensitivity to the actions of the opposition are three critical components of playing before the flop (Hellmuth, 2003). Pot odds and implied odds are also significant consideration. After the flop, the player's actions will depend on many factors, however, as a rule; none will have more weight than the exposed cards (Steiner, 1996). Stated simply, if the community cards do not coordinate with the hole cards, players should strongly consider folding the hand. If their hands have potential they should use pot odds to determine if it is correct to

continue playing. Many of the same considerations will apply after the turn card has been exposed. However, it is now much easier for players to fold the hand because only one card remains to be seen. Therefore, the odds of completing speculative hands are now greatly reduced.

Generally speaking, players still contesting the pot when the river card hits, should have a strong hand (Harroch, 2000). Once the river card is exposed the hand value is fully realized. Players remaining in the hand will show their cards and a winner will be declared. Players who have folded should play close attention to this showdown, as this is an unmatched opportunity for discovery (Vorhaus, 2004). Players should take this time to review the play of the hand to make observations about their opponent's range of hands and style of play (Silberstang, 1996).

There will be times when starting hand value, position, and probabilities will not determine which decisions are made at the Hold'em table. In such cases, psychology, intuition, and logic will be more useful (Burgess, 2004). When the time is right players can employ advanced strategies like bluffing and semi bluffing to take pots that would otherwise be lost. In some cases they will even prompt opponents to fold better hands (Gordon, 2004). In other cases Hold'em players will need to hide the strength of their hands in order to get value from them. In either case, deception will keep opponents guessing. Players capable of combining these advanced strategies along with the fundamental concepts will experience winning results at the Hold'em table.

Problem Solving and Decision-Making Summary.

There are numerous decision-making and problem solving tools, techniques, and models. Most of the models or processes used for problem solving and decision-making

include multiple steps or phases (Problem Solving and Decision Making). Some favor logical mental processing while others lean toward the creative nature. Ultimately, many believe that it is important to integrate appropriate amounts of both into the problem-solving and decision-making process. Understanding how various tools and techniques work can help improve the quality of decision making (Certo, 2003).

The type and amount of information available is one of the most important factors in decision-making (Moorhead, 2004). Information is the primary factor in predicting an outcome. There are also two basic types of decisions. They are programmed and nonprogrammed. Programmed decisions are well structured and routine (Leonard, 2004). They happen with enough frequency for a decision rule to be developed (Robbins, 2001). A decision rule explicitly declares which alternative to choose. Nonprogrammed decisions are poorly structured, with ambiguous information, and goals that are vague (Moorhead, 2004). Therefore, they require problem-solving behaviors to be exercised (Leonard, 2004).

Certain personality characteristics also affect the way an individuals make decisions (Robbins). Good decision makers will have a high tolerance for ambiguity and a well-ordered sense of priorities (Leadership Decision Making). They will practice good listening skills and look for ways to build consensus around a decision. They will avoid making stereotypes. They will remain flexible, be comfortable with input that is hard or soft, and be realistic about costs and difficulties. They will have the ability to see when a problem has an opportunity hidden within it (How to Make Good Decisions).

In the end, having the right information, adequate time, and the willingness to consider all the options will provide the best chance for decision-making success (What should I do in preparation for making a decision?). It will also be important to practice

contingency planning (Moorhead, 2004). This is necessary when the primary course of action is unexpectedly disrupted or rendered unsuitable.

Taxonomy Summary.

Taxonomy involves the division of collections or clusters into controlled groups or categories of items (5 entries found for Taxonomy, 2006). The sorts occur based on similarities of structure, origins, and natural relationships. The rules of scientific classification frequently have a structure that is hierarchical (Taxonomy, 2006). Once used for classifying living organisms, today, the term taxonomy may refer to the classification of animate or inanimate objects.

The term systematics is sometimes used synonymous with taxonomy to describe the general principles of scientific classifications (5 entries found for Taxonomy, 2006). Other connections are made between taxonomy and the word oontology (Ontology, 2006). Ontology refers to a collection of objects or mental processes that share some characteristics. When used to describe mental events, ontology is said to be the study of conceptions of reality.

E-Learning Summary.

For the purpose of this paper, e-Learning is the delivery of learning material without the presence of a human instructor using computer technology as the interface between the training content and the learner (The Three Views of e-Learning). Both advantages and disadvantages were found regarding the e-Learning. The advantage include flexibility of training delivery to the learner, group or individual focus (The Three Views of e-Learning), reduced travel costs (What Should Be Taught Via the Web?), immediate learner feedback, and the ability to deliver content ranging from the elementary to mastery levels (What is Web-Based Training?). Lastly, multi platform

design and delivery capabilities are among the reasons for the growing levels of interest and acceptance.

While e-Learning is emerging as a cost effective and efficient way to reach remote learners, it also has limitations. The disadvantages include minimal human interaction, long periods of time on the computer can be difficult for some, and the development time can be extremely long and costly (What is Web-Based Training?). Bandwidth and browsers limitations can also be very restrictive. (The Three Views of e-Learning). The need to provide server access and control usage may also confine e-Learning applications. Lastly, hands-on exercises and emotionally sensitive subjects are not well suited for the e-Learning environment.

Analysis

Although this study did not contain a survey of human subjects, it did seek answers to a number of questions. These were stated in the purpose of the study. The questions were:

1. Can a body of knowledge concerning the game of Texas Hold'em be compiled that exemplifies winning strategies?
2. Can problem-solving and decision-making models be applied to the game of Texas Hold'em?
3. Can Texas Hold'em information and strategy be categorized to form a taxonomy based on the mental processing of complex information at distinct levels?

4. Can the topical information be synthesized to create e-Learning modules that would display multi-level strategic assertions under live Texas Hold'em game conditions?

In support of the goals of this study, the remainder of this section attempts to answer these questions. They will be addressed in the order in which they appear. It also explains how the information discovered in the Literature Review might be synthesized to create an on-line tutorial for learning Texas Hold'em.

Texas Hold'em Strategy.

After a thorough review of the literature regarding Texas Hold'em it has been concluded that a body of knowledge concerning strategic play does exist. In fact, much has been written on the subject. However, the play of Texas Hold'em is highly situational. Therefore, thoughtful contemplation of the every situation is required before making any tactical or strategic decisions.

Texas Hold'em and Decision Making.

During the examination of Texas Hold'em strategies and concepts it was revealed that decision-making is a key component of successfully playing the game. In many ways Texas Hold'em decision-making is quite straightforward. The choices are limited to only five possibilities. At every stage during the play of a hand players will be required check, bet, call, raise, or fold. These options will never change. What will change are the momentary circumstances, game conditions, situational goals, long-term ambitions, and the information that is available. The motives behind each decision will be traced directly to the processing of these factors.

When choosing a course of action, successful Hold'em players will use many of the tools and techniques associated with other types of problem solving and decision-making. Their thought process will be similar to the steps described in the Rational Model. At various stages along the way they will need to acquire information on which to base their decisions. They will also use decision-making tools and techniques to: analyze the forces for and against a particular option, determine who has the most power, and assess their risk verses the potential reward. Lastly, they will need to avoid many of the common decision-making traps.

Hold'em players will also need to remember that even when they have made the correct decision or series of decisions during the play a particular hand, session, week, or even over the course of a month, they can still lose. In fact, this experience is not uncommon. It is due to statistical variance, or what some people call luck. Despite the best decision-making efforts, the cards have not cooperated. However, this phenomenon will be relatively short lived. In the end, a proper understanding of the games tactics and strategies and the ability to make correct decisions will be the difference between long-term winning and losing.

Taxonomy of Hold'em.

During the examination of Texas Hold'em strategies and concepts, three central themes seemed to recur. At virtually every juncture of the game, players are forced to use their understanding of probabilities, responsiveness, and obfuscation to effectively play their hands. The weight given to each these factors will be situational. It will depend on the antecedent conditions and the player's goals; however, each should be given some consideration.

The comprehension of probabilities is related to the positive expectation of the hole cards held prior to the flop, the number outs after the flop and on the turn, and the calculation of the pot odds throughout the hand. To make their decision players might use a cost/benefit analysis to determine when it is mathematically correct to invest money into a pot.

Regarding responsiveness, players must be able to react to the actions of their opponents. They must also be able to see the inherent dangers of the exposed community cards. To accomplish this they use observation, intuition, and instincts to estimate their strength compared their opposition in a given situation. At the conclusion of each hand, players need to assess their opposition's play and assign motives to their actions throughout the play of a hand. This understanding is situational; however, the information can be utilized to build opponent profiles. Profiling can be a useful forecasting tool when deciding how to respond in future situations.

Lastly, players need to "*obfuscate*" opponents by randomly employing fundamental and advanced poker tactics and strategies. This type of play conceals situational strength and keeps the opposition confused throughout the session of play. Ultimately, opponents can become frustrated by their inability to predict, with any degree of certainty, the actions, strength, or motives of their rivals. Players may also employ psychological banter to distract opponents and disrupt their ability to make right decisions.

The mental processes associated with calculating probabilities, practicing responsiveness, and applying the techniques of obfuscation makeup the taxonomy of Texas Hold'em. Whether this mental processing is deliberate or unconscious, advanced Hold'em players will apply these three concepts at every stage of play for the rest of their

life. Therefore, the mnemonic "*PRO*", which represents this taxonomy, could be the basis for any proposed instructional tutorial.

E-Learning Modules.

The scrutiny of e-Learning information revealed that the effective development of a Texas Hold'em tutorial is plausible. The topical information regarding Texas Hold'em and decision-making could be synthesized to create e-Learning modules. Although no tutorial has actually been created, some suggestions for development will be discussed in the recommendation section that follows.

Recommendations

There are essentially five major recommendations resulting from this study. First of all, a study of quality concepts and practices should be undertaken to determine if there are applications to the game of Texas Hold'em. Secondly, the development of the online gaming tutorial should take place. Development proposal are discussed in the following pages. Third, players should be studied for a period of one year to determine if there are changes in their standard deviation or winning percentage. This would help to determine the effectiveness of the tutorial. Fourth, players should be observed while playing different variation of Texas Hold'em to see if changes in the tutorial are needed to accommodate for betting limits and game characteristics. Lastly, players should be monitored to determine if the on-line design elements are functional.

The following section includes various recommendations regarding the tutorial development process.

Tutorial Development.

It is recommended that a tutorial for learning Texas Hold'em be developed. It should be called the Texas Hold'em PRO Accelerator. The name and the learning content

will be derived from the taxonomy of Hold'em. The purpose of the tutorial should not be to tell players how to think; rather its aim should be to teach players what to think about. By directing the player's mental processes it is hoped that, in time, they will develop the ability to make winning choices regarding probabilities, responsiveness, and obfuscation naturally and consistently under live game conditions.

Developing the tutorial for the transfer of Hold'em knowledge will be a challenge. One reason for this is the volume of information. Literally hundreds of pieces of information exist regarding the topic of Texas Hold'em. The information can be found in books and magazines, on web pages, and in video presentations. In order to appropriately portion or chunk this material, at least three training modules should be developed. Furthermore, the learning materials for these modules should be created using the precepts of instructional systems design. Each should include course objectives, relevant learning activities, and assessments.

The on-line learning environment should allow for maximum learner interaction. The interactive components should allow the learner to make choices about their instruction. For example, each learning module should have a predetermined sequential learning route; however, user option buttons should be incorporated that allow the learners to deviate in directions best suited for accomplishing their learning goals. Additionally, remediation opportunities should be present at numerous stages throughout the tutorial. Lastly, new models and matrices should be developed using the tools and techniques of decision-making. These decision-making aids should be printable, so they can be made available to learners while they are playing the game of Hold'em.

Module one should begin with an overview that states the course outcomes. It should also briefly explain the instructional methods and processes used in each of the

other learning modules. Next, the learning objectives for module one should be listed. These objectives should correlate to the knowledge and comprehension facets of the cognitive domain described by Bloom's taxonomy.

The learning materials in module one should introduce the players to the basics of Texas Hold'em. For some this information may be a review. In such cases, those learners should be able to skip to areas where their knowledge of Hold'em is more limited. They should also be allowed to move directly to another module. Module one should end with a game or some other engaging assessment activity that allows the learner to recall the information that was presented.

Module two should advance the learners to the more intricate levels of Hold'em. The objectives of module two should be associated with the application and analysis facets of the cognitive domain described by Bloom's taxonomy. This learning module should begin with an introduction of advanced Hold'em concepts and strategies. Then various activities should require the learners to distinguish how and where the information might apply. At the end of module two, an interactive assessment activity should be used to determine what learning may have occurred.

Module three should be designed to work in chorus with a Texas Hold'em computer simulator or while playing on-line at one of the many web sites offering the game. The goal should be to provide access to strategy information without causing delays in the game. In recognition of the technological limitations, related to personal computing power and broadband capabilities, the tutorial should be designed to use minimal system resources. By doing so, the user will not need to be concerned with delays related to the information processing. Hopefully, this will allow for a comfortable and distraction free learning environment.

The best way to learn the game is to play. Therefore, the objectives for module three should attempt to have the learner evaluate and synthesize the Hold'em information while playing in a real game. These objectives are associated with the highest levels of the cognitive domain described by Bloom's taxonomy. The learners should be able to actually use the tutorial to guide their decisions while actively engaged in a real game of Texas Hold'em. Playing in the moment it is hoped that players become situational experts. At various points the learners should be presented with the opportunity to access remedial information. This will allow them to access strategy information and other figures as needed.

At the end of module three players should be asked to evaluate their performance. Here they should have an opportunity to make notes about their play and record the win/loss results of the session. In conclusion, the proposed tutorial should highly interactive and allow the learners to track their skill progression and record of win and losses.

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Appendix A - Rank of Poker Hands

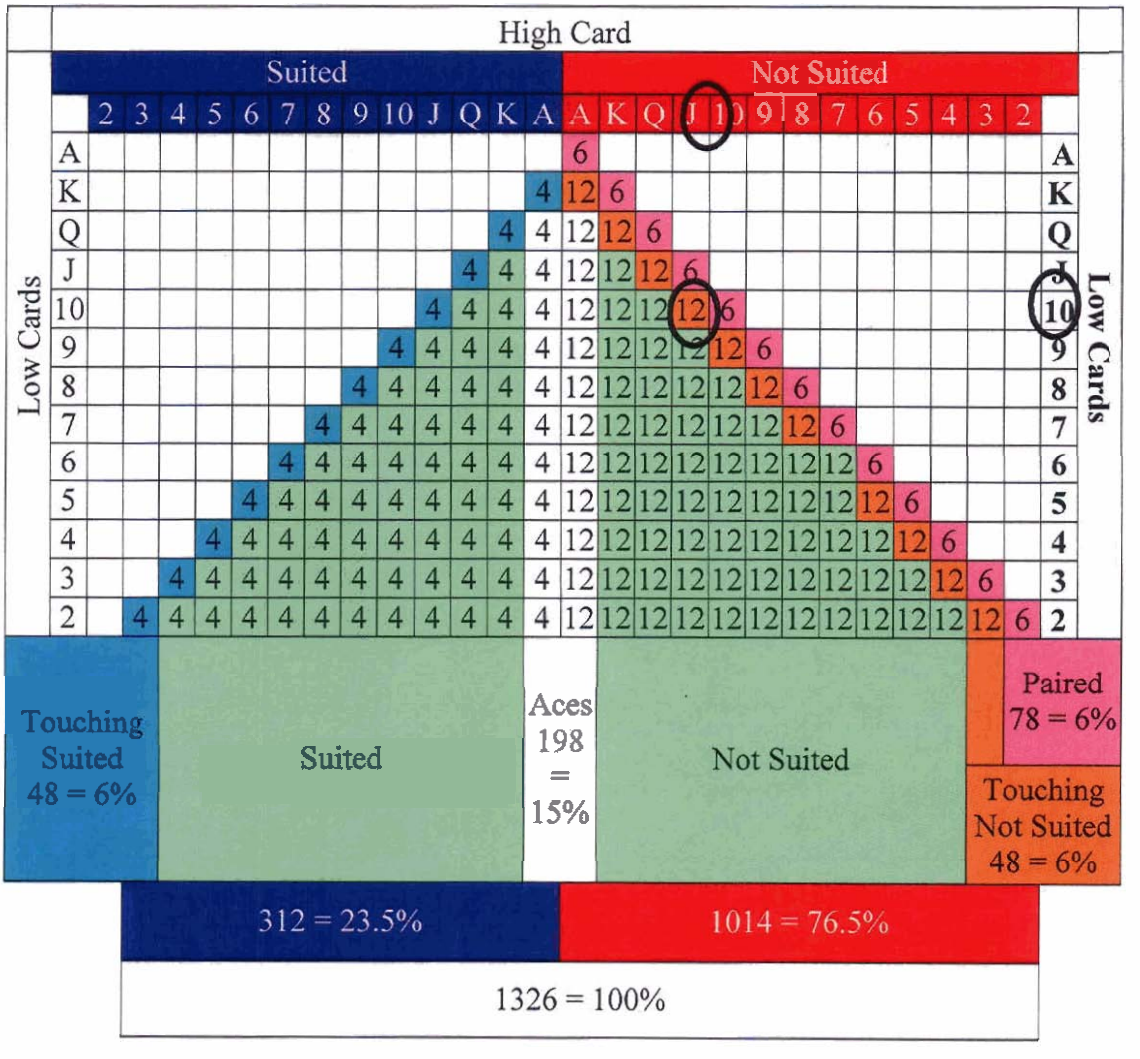
The hand rankings are shown from best to worst.

Hand Rank	Description
1	The best possible hand in poker is a Royal Flush. The Royal Flush is composed of an Ace-High straight, with all the cards of the same suit. Poker players will rarely see this hand. It is similar to getting a hole in one in golf.
2	Straight Flush - A straight Flush is made up of 5 cards of the same suite ranked in succession. It is extremely rare.
3	Four-of-a-Kind (Quads) – Quads are four cards of the same rank.
4	Full House (Full Boat, Boat) - A full house happens when a player has Three-of-a-kind and a pair.
5	Flush - A flush occurs when a player has five card of the same suite.
6	Straight - A straight occurs when a player has five cards of sequential rank. Note that in Hold'em an Ace can be high or low.
7	Three-of-a-Kind (Trips or a Set) – This hand occurs when a player has three cards of the same rank.
8	Two Pair – This hand is made of two cards of the same rank and another two cards of the same rank.
9	One Pair – Occurs when a player has two cards of the same rank.
10	High Card – Occurs when a player does not have any of the above hands. In this case, the highest card determines the hand value. The example shows a King High.

(Texas Hold'em Poker Hand Rankings, 2005)

Appendix B – Possible Hole Card Combinations

This appendix shows all 1326 possible starting hands in Hold'em. Note that suited card combinations are on the left and unsuited cards are on the right. Also note that the high cards are shown at the top and the low cards are shown along the sides. The number contained in each cell indicates the number of two-card holdings that meet the particular description. For example the circled cells show that there are 12 different ways in which the unsuited Jack-10 (J-10) combination can occur. Distribution of Two-Card Holding Pre Flop



(Steiner, 1996)

Appendix C

The Probability Of Being Dealt Specific Hold'em Hands Before The Flop

Probability of being dealt...	Percentage	Odds against it
Pair of Aces	0.45	220 to 1
Premium Pair (KK, QQ or JJ)	1.36	72.7 to 1
Medium Pair (2 tens - 2 sixes)	2.26	43.2 to 1
Small Pair (2 fives - 2 deuces)	1.81	54.3 to 1
Ace-King Suited	0.3	331 to 1
Ace-King off-suit	0.9	110 to 1
Ace-Queen or Ace-Jack suited	0.6	165 to 1
Ace-Queen or Ace-Jack off-suit	1.81	54.4 to 1
Ace-Ten or less suited	2.71	35.8 to 1
Ace-Ten or less off-suit	8.14	11.3 to 1
Any Pair	5.88	16 to 1
Any two cards suited	23.53	3.25 to 1
* Any 2 suited connectors	2.11	46.4 to 1
* Any 2 connectors off-suit	6.33	14.8 to 1
Any hand with a Pair or an Ace	20.36	3.91 to 1

The (*) indicates two cards in order that allow the maximum chance at a Straight. The lowest eligible combination is 5-4. The highest eligible combination is Jack-10. (The Probability Of Being Dealt Specific Hold'em Hands Before The Flop, 2005)

Appendix D - Probabilities of Completing a Hand

Probabilities of Completing a Hand with Two Cards to Come

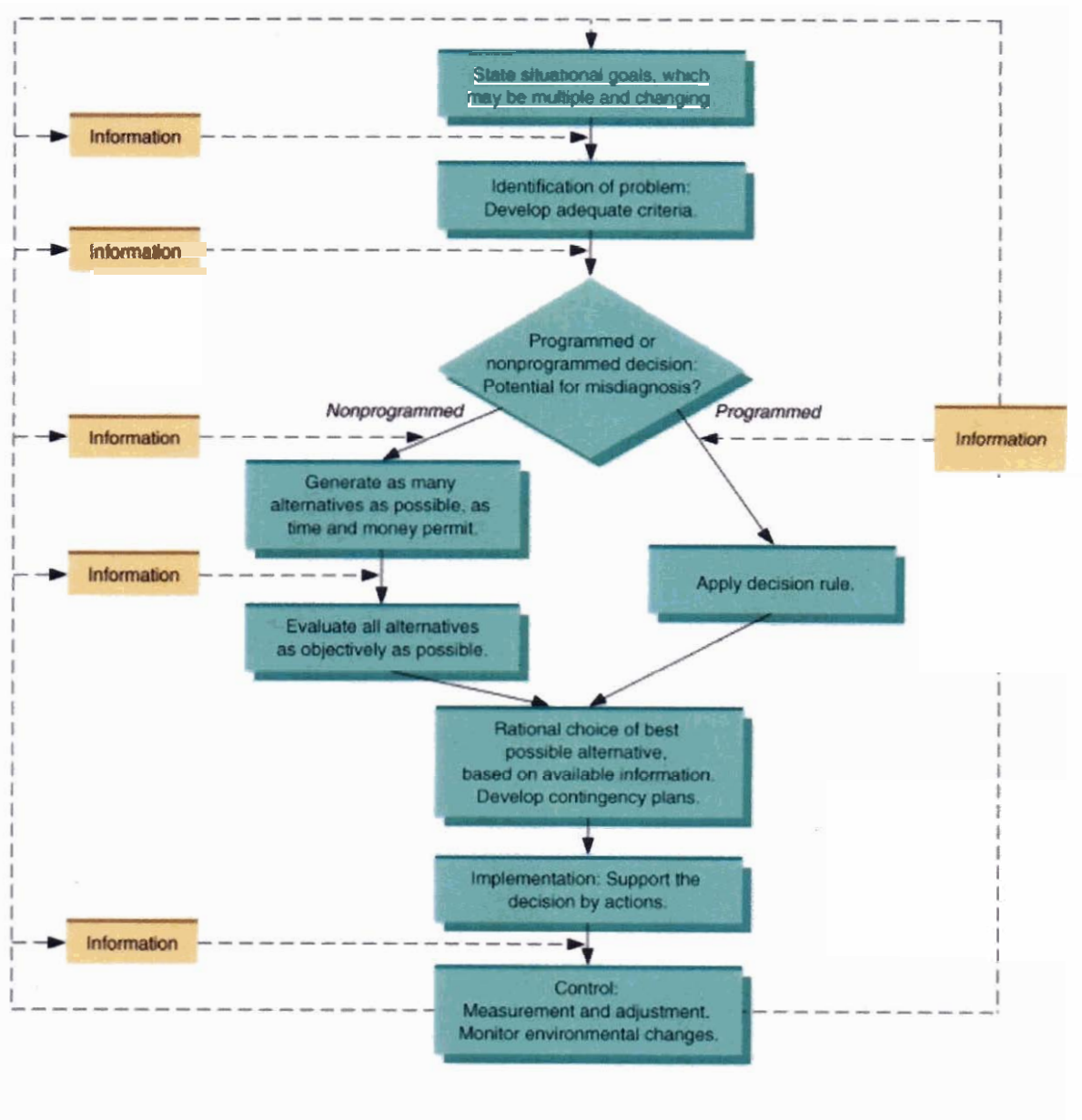
Number of Outs	Percentage of hitting on either the Turn or River
1	4.4
2	8.4
3	12.5
4 (Inside straight draw)	16.5
5	20.3
6 (Two overs)	24.1
7	27.8
8 (Open ended straight draw)	31.5
9 (Flush draw)	35.0
10	38.4
11	41.7
12 (Flush draw + Gut shot)	45.0
13	48.1
14	51.2
15 (Straight Flush draw)	54.1
16	57.0
17	59.8
18	62.4

Probabilities of Completing a Hand with One Card to Come

Number of Outs	Percentage of hitting on the River
1	2.2
2	4.3
3	6.5
4 (Inside straight draw)	8.7
5	10.9
6 (Two overs)	13.0
7	15.2
8 (Open ended straight draw)	17.4
9 (Flush draw)	19.6
10	21.7
11	23.9
12 (Flush draw + Gut shot)	26.1
13	28.3
14	30.4
15 (Straight Flush draw)	32.6
16	34.8
17	37.0
18	39.1

(Warrens, 2003)

Appendix E - The Practical Approach Model to Decision Making



(Moorhead, 2004)

Stoeklen, Jeanne

From: Johnston, Claudia
Sent: Tuesday, August 22, 2006 9:06 AM
To: Stoeklen, Jeanne
Subject: RE: Time Off

OK.

From: Stoeklen, Jeanne
Sent: Tuesday, August 22, 2006 9:04 AM
To: Johnston, Claudia
Subject: RE: Time Off

I'll be gone on Wednesday but will be here all day on Thursday.

From: Johnston, Claudia
Sent: Tuesday, August 22, 2006 9:02 AM
To: Stoeklen, Jeanne
Subject: RE: Time Off

OK; GOOD FOR YOU!! So, you're off tomorrow, right? Are you going to take Thursday off as well?
-cj

From: Stoeklen, Jeanne
Sent: Tuesday, August 22, 2006 7:25 AM
To: Johnston, Claudia
Subject: Time Off

Claudia,

I would like to take the following time off:

Friday, August 25
August 28 – September 1
December 26 – 29

Thanks!

Jeanne